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Being an Expansion of a Lecture delivered at a Special Meeting of the Royal Society of Medicine on Nov. 30th, 1922,

BY SIR ALMROTH E. WRIGHT, M.D., F.R.S.

PART I.*

Pasteur was the first to think out the principles involved in Jennerian vaccination, to show how these could be applied to bacterial infections, and to conceive the idea of prophylactic inoculation against all infective diseases.

The tenets he laid down—let me in view of what is to follow speak of them as Code No. 1 or the original Pasteurian Code—may be set out somewhat as follows:—

CODE NO. 1.—THE ORIGINAL PASTEURIAN CODE.

1. The essential preliminary to any prophylactic procedure is to possess ourselves of the pathogenetic organism, or if this is as yet undiscovered of the virus that contains it, and to manufacture a vaccine from this.

2. The vaccine must consist of living germs; but these must, with a view to the risk that would attach to the employment of virulent material, be attenuated.

3. When an appropriately attenuated vaccine—that is, a vaccine which can be warranted to produce only a moderate clinical reaction—has been obtained, the exact quantum implanted will not be of material importance.

4. Bacterial vaccines should be implanted subcutaneously.

5. Vaccination is applicable only to the uninfected.

6. The protection conferred by the vaccine is always specific—in other words, protection is obtained only against the species of pathogenetic agent of which the vaccine consists.

7. Protection is obtained only after the lapse of ten or more days from the date of inoculation,

By putting into practice these principles—and they relate, as you see, only to prophylaxis—great and notable successes were achieved. In particular, Pasteur succeeded in protecting sheep and cattle against anthrax. Later Ferran, and after him Haffkine, employing a much more exact technique, applied the Pasteurian methods to man in their anti-cholera inoculations.

In the meanwhile, impelled to do so by that "pain in the mind" which is felt when one is appealed to and is powerless, Pasteur had addressed himself to another problem in connexion with immunisation—the problem as to whether it would, by any application of vaccination, be possible to arrest the development of rabies in a patient bitten by a rabid animal. Here, of course, his principle that vaccination was applicable only to the uninfected suggested that nothing could be done. But emotional tension is intolerant of any intellectual impasse, and its special function in such circumstances is to insist on a critical probing of subsisting rules, and on a definition of all undefined or loosely-defined terms, and on a sharper focusing of all nebulous elements of thought. Here, therefore, it was bound inevitably to lead to a critical review of the principle that vaccination is applicable only to the uninfected, and to a general or sharper focusing of the terms "infected" and "uninfected." And then it was discerned by Pasteur—and afterwards, of course, by all the world—that a patient in whom the virus of rabies has been implanted should, pending the development of events, be reckoned as uninfected; and, further, that if it takes for a virus much more than ten days, and for protection after vaccination only about ten days, to develop, the patient is within that period a perfectly suitable subject for preventive inoculation.

This forward step in thought, with which Pasteur broke away from what had been handed down and also from what he himself had formulated, bestowed upon us the preventive treatment of rabies. It was, as we shall see, destined to lead also to therapeutic inoculation.

A Supplementary Article of the Pasteurian Code.

We may now complete the Pasteurian Code as set out above by adding to it this supplementary item.

8. Vaccination may be resorted to in the incubation period of a disease, provided that that incubation period has still more than ten days to run.

That brings to a close the great opening chapter of scientific immunisation—the chapter contributed by Pasteur.

THE NEXT ADVANCE IN IMMUNISATION—ANTI-TYPHOID INOCULATION.

We have seen in the foregoing that emotional tension conducts to a closer scrutiny and sharper focusing of ideas, and that it is by the clarification which results from such closer focusing that problems are resolved. This holds true over the entire domain of knowledge, and is again exemplified in connexion with the next two advances in the field of immunisation—those made in connexion with anti-typhoid inoculation. These improvements were (*a*) the substitution of dead for living vaccines, and (*b*) the preliminary gauging of the efficacy of prophylactic procedure by measurement of the anti-bacterial elements produced in the blood. Of these forward steps, the first was taken because of hesitation to risk inoculation with living typhoid bacilli; the second, from unwillingness to launch out with a vaccine of dead microbes without first obtaining proof of its efficacy.

The general progress of knowledge had already furnished certain facts and general inferences which bore on these issues. To begin with the conception that the antigens required were the metabolic products elaborated by microbes growing in the organism was becoming discredited, and was being gradually replaced by the conception that the antigens required were elements derived from the bacterial protoplasm. Again, the general principle—enunciated by Ehrlich in the apophthegm *corpora non agunt nisi soluta* was silently pointing to the conclusion that in vaccines the living or dead germs, as such, could not be the actual antigens; that these must be dissolved elements; and that the microbes in vaccines, whether they were dead or alive, could in reality be only mother substances of antigens. Lastly came the important fact that Pfeiffer had, by the incorporation of dead typhoid microbes into man, obtained a production of agglutinating substances. In consequence attention in the first anti-typhoid inoculations was focused upon the production of agglutinins.[1] But the measurement of these showed very little more than that an immunisation response was obtained by the incorporation of dead microbes. Measurements of the bactericidal power of the blood[2] were then undertaken, and it was these that brought illumination. They established that when quanta of typhoid vaccine which produce moderately severe constitutional disturbance are incorporated, inoculation is followed first by a negative phase, in which the bactericidal power of the blood is reduced, and then by a positive phase in which the bactericidal power may be increased as much as 1000-fold; further, that when doses which produce very severe constitutional disturbance are employed the negative phase is protracted, and in

* Parts II. and III. will be published in coming issues.

[1] Wright: THE LANCET, Sept. 19th, 1896; Wright and Semple: Vaccination against Typhoid Fever, B.M.J., Jan. 30th, 1897.

[2] Wright: Changes Effected by Anti-typhoid Inoculation in the Bactericidal Power of the Blood, with Remarks on the Probable Significance of these Changes, THE LANCET, Sept. 14th, 1901.

some cases perhaps indefinitely protracted; and lastly, that when doses which produce only trifling constitutional disturbance are employed a positive phase is obtained without the intervention of any negative phase, and the bactericidal power of the blood is already after an interval of 24 hours very considerably increased.

These facts supply the principles which everywhere regulate—or perhaps it would be safer to say should everywhere regulate—anti-typhoid, anti-cholera, anti-pneumonia, anti-plague, and all other prophylactic inoculations.

Again, the observation that protective substances can be made to appear in the blood within 24 hours from the incorporation of a vaccine was one which carried consequences. It was deducible from this that the procedure of inoculation in the incubation period cannot be applicable only to rabies with its average incubation period of many months, but must, in theory, be applicable to typhoid and Malta fever with their incubation periods of a couple of weeks, and even—as contended by Haffkine—to plague with its incubation period of only a couple of days. But the full scope of application of the facts brought to light in connexion with anti-typhoid inoculation did not appear until the concept of an incubation period had been sharply focused, and until this had been seen to import a period when the microbe is cultivating itself in the body, not broadcast but confined in one region. Once that fact is regarded, there is, as you will see, no getting away from the conclusion that the successful event of the Pasteurian preventive treatment in rabies, and, it may be added, the occasional successful event of anti-plague inoculation administered in the incubation period of plague, must be due to immunising responses successfully evoked by the vaccine in the still uninfected regions of the body. That idea—the idea that the uninfected and still inactive regions of the body can by applying the stimulus of a vaccine be made to bring succour to the infected regions was, as you know, the mother idea of vaccine-therapy.

Now let me—for I shall want this as a point of departure for setting out my new matter—formulate in the form of a code the principles we have just been considering. The code now in question—for convenience of reference I call it Code No. 2—has been gradually elaborated in the Inoculation Department of St. Mary's Hospital. You will observe that here only the first, fourth, and seventh tenets have been taken over practically unmodified from Pasteur.

CODE NO. 2.—FOUNDED UPON A STUDY OF THE BACTERICIDAL AND OPSONIC CHANGES PRODUCED IN THE BLOOD BY THE INOCULATION OF VACCINES INTO THE PATIENT.

1. The essential preliminary to all immunisation procedures is to possess ourselves of the microbe of the disease, or failing that of its virus, and to employ this as material for the manufacture of the vaccine. And here it may be parenthetically pointed out that inasmuch as in prophylactic inoculation the vaccines are stock vaccines and give good results it cannot in any form of inoculation be theoretically essential to employ vaccines made directly from the patient.

2. Vaccines should in all cases where the microbe can be cultivated outside the body consist of sterilised cultures.

3. Vaccines may be turned to account in a variety of different ways. They may be employed not only for prophylaxis but also for preventive treatment in the incubation period of general infections. Again, they may be therapeutically employed in all localised infections other than those complicated by pyrexia and heavy and frequent auto-inoculations. In this last class of infections, and also in those septicæmic processes in which bacterial toxins in large quantity are circulating in the blood, vaccines are contra-indicated.

4. Bacterial vaccines should be incorporated hypodermically.

5. The quantum of vaccine incorporated is of supreme importance; it affects both the kind of response and the rate at which protective substances appear. With only small doses of vaccine, or comparatively light auto-inoculations, a positive phase—or as it may be better called, an epiphylactic or immunising effect—may be registered in less than 24 hours after the incorporation of the vaccine. A similar but evanescent increase, known as the false rise, may be registered within a couple of hours after larger doses of vaccine and heavier auto-inoculations. These larger inoculations of vaccine and heavier auto-inoculations produce after that very fleeting positive phase a negative phase or—for these are better terms—an apophylactic or de-immunising effect. And this effect is greater and lasts longer the larger the quantum of antigen carried into the blood.

6. In correspondence with the above the following rules of dosage may be laid down. In prophylactic operations undertaken in uninfected surroundings the dose should be that which evokes the optimum epiphylactic response, and it is for the attainment of that end permissible to employ doses which produce a temporary negative phase. When inoculating prophylactically in the presence of an epidemic, or in the incubation period of a general infection, and generally in the treatment of localised infections, reduced doses should be employed in order to avoid the constitutional disturbance and temporary aggravation of symptoms and dispersal of microbes in the organism. Reduced doses should also be employed where the chief matter of concern is to obtain with promptitude some clinical improvement.

All these rules can be summarised into one general principle—that the dose of vaccine incorporated should depend on the patient's being infected or uninfected, and that where he is infected the dose should stand in inverse relation to the volume of his infection.

7. The anti-bacterial substances elaborated in response to inoculation operate specifically upon the variety of microbe which has furnished the vaccine, but it is possible that in addition some collateral immunisation is achieved.

I cannot here attempt to give even a brief summary of what has been achieved by the following out of this newer code. To do so I should have to chronicle all that has in the last 20 years been achieved by prophylactic and therapeutic inoculation in connexion with bacterial disease. Instead of attempting that, let me fix your attention on the fact that, except in a few isolated instances, therapeutic inoculation has proved unavailing in pyrexial phthisis and in septicæmia. And I may again point out that it is in the nature of things that the failures here in question should evoke in some of those who have had over and over again to witness them the same emotional tension and the same closer focusing of ideas which led to Jennerian vaccination, to Pasteur's thinking out the principles of immunisation, to the extension of prophylactic treatment to human diseases, to the Pasteurian preventive treatment of rabies, to the treatment of diphtheria by antitoxins, to vaccine-therapy, and to therapeutic advances along other lines. All this is, as you have discerned, only a prelude to setting out to you the outcome of an inquisition into those universally accepted principles which have hitherto guided vaccine-therapy, and to telling you of certain new principles which have in the last few years gradually emerged.

I have here to choose between two different modes of exposition. I could start by describing the new technical procedures which have been devised, could then, in connexion with each method, tell you the new facts it has furnished, and could then leave it to you to make at the end your own generalisations. That would be like leading you along a number of new paths, showing you hurriedly a portion of what could be seen from each, and leaving it to you to build up from those glimpses a general map of the country. The alternative, and proper, method will be for me, who have been every day engaged in exploring these paths, to give you at the start the general scheme of the landscape and then afterwards to describe to you the methods of exploration and tell what each of these has yielded.

The new principles which have emerged will best be set out in the form of yet another code. This will be Code No. 3, and I would wish you, when taken aback at its subversive character, to observe that there is here a going back, not upon anything directly established by experiment, but only upon dogmata built upon a foundation of uncoercive inferences. I have in view here not only the tenets of the Pasteurian code, but also the doctrine of phagocytosis with its implication that leucocytes can kill microbes only by phagocytosis. I wish you also to bear in mind that

the code here brought forward rests almost exclusively on experiments with the staphylococcus and streptococcus, that up to the present it has been put into actual operation almost exclusively in the treatment of infections by those microbes, and that the question of its application to prophylactic procedures is yet quite unstudied.

CODE NO. 3.—FOUNDED UPON A MORE DETAILED STUDY OF THE CHANGES PRODUCED IN THE BLOOD BY INOCULATION OF VACCINES IN VIVO AND IN VITRO.

1. While the nature of the infecting microbe should in every case be ascertained, it is not theoretically necessary that the vaccine employed in treatment or arrest of the incubating infection should be derived from the species of microbe which causes the disease. Sufficient justification for recourse to a particular vaccine is afforded when that vaccine has been shown to increase the antibacterial substances which operate upon the infecting microbe.

2. When vaccines in appropriate doses are added to the blood, whether in vivo or in vitro, instantaneous epiphylactic response is evoked, and the maximal response may be expected after only very short delay.

3. The epiphylactic response here in question consists in an extrusion of opsonic and bactericidal elements from the leucocytes. And it is mainly by this ectocytic chemical action, and only to an insignificant extent by phagocytosis and internal digestion, that the bactericidal action of the leucocytes is exerted.

4. The antibacterial substances here in question are polytropic—in other words, they operate not only upon homologous but also upon quite unrelated species of microbes.

5. Where the effective dose of vaccine for intravenous application has been ascertained, this method of administration is from considerations of certainty and rapidity of therapeutic action to be preferred to subcutaneous inoculation.

6. In septicæmias and other heavy bacterial infections the patient's leucocytes lose their power of responding to vaccines. In such cases it is essential before inoculating to satisfy one's self that the patient's blood still retains its power of epiphylactic response.

7. Where by reason of the poisoning of leucocytes active immunisation by means of vaccines is ruled out, the method of immuno-transfusion should be resorted to—in other words, healthy human blood which has made proper epiphylactic response should be incorporated.

Having now formulated the new principles arrived at, I must next show the data upon which these are founded. Those data were, as you will understand, obtained by adding measured quanta of vaccines or, as the case may be, living microbes, to the blood as a whole or to its separate element. Let me begin with a conspectus of the methods of blood examination which have here come into application.

CONSPECTUS OF METHODS OF BLOOD TESTING.

I. *Whole Blood.*

(1) Measurement of hæmobactericidal power.
(Bactericidal effect of the leucocytes and serum acting in conjunction.)
- Implanting and explanting.
- Implanting and inculturing.

(2) Measurement of phagocytic power.
- With defibrinated blood.
- With washed leucocytes and serum (reconstituted blood).

II. *Serum.*

(1) Measurement of serobactericidal power.
- Implanting and explanting.
- Implanting and inculturing.

(2) Measurement of opsonic power.

III. *Leucocytes.*

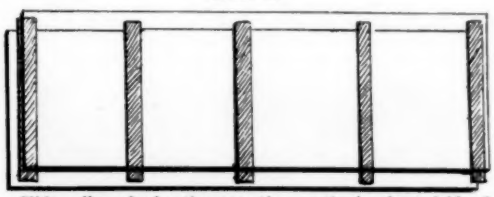
(1) Measurement of phagocytic efficiency.
(2) Measurement of spontaneous emigration and chemotactic reactions.
(3) Measurement of ectocyto-bactericidal power (i.e., power of killing extracellularly).
(4) Measurement of opsonodoteric power (i.e., power of furnishing opsonins).

IV. Combined measurement of—
Phagocytic Power, Opsonic Power, and Phagocytic Efficiency of the Leucocytes.—*Chiastic procedure.*

A few words of general introduction and, in the case of those methods which have been newly devised, a brief description will be required. Let me deal first with the measurement of the bactericidal power of the whole blood.

Methods of Measuring the Hæmobactericidal Action.—This can be measured (1) by the *implanting and explanting procedure*, i.e., by bringing together measured volumes of defibrinated blood and graduated dilutions of a bacterial culture, and then after a fixed interval diluting with nutrient broth, and then either growing the surviving microbes in the broth-diluted blood, or explanting on to an agar surface. An alternative method of measuring the bactericidal power of the whole blood—available only when dealing with serophytic microbes—is (2) the *implanting and endo- or in-culturing procedure.* The principle of the latter method is to implant graduated quanta of microbes into the blood; to introduce the implanted blood into very fine capillary tubes, or, better, into "slide cells"; and to incubate, so as to let such microbes as survive grow out into colonies.

FIG. 1.



Slide cell ready for the reception of the implanted blood.

Slide Cells.—These are made from ordinary microscopic slides. We take a sterilised slide, place it with its convex side turned uppermost on the bench, and then provide confining walls for four compartments by taking strips of paper dipped in very hot vaseline, and laying these down at both ends and at equal intermediate distances along the slide. We then take another slide, hold it in the flame, concave side downwards, and then immediately press it down upon the vaselined strips. The paper employed for these strips must be of standard thickness so as to give blood films of appropriate and uniform depth. If the blood film is too thick the growing colonies are concealed, and if it is too thin the leucocytes are too remote from the implanted microbes—moreover, there is not a sufficient depth of red corpuscles to show up the colonies to advantage. A convenient depth of film is obtained by using for our strips a paper about 1/300 inch (1/12th mm.) in thickness. The detail of the procedure for measuring the hæmobactericidal power in slide cells is as follows: We begin by making a series of progressive dilutions of our bacterial culture. Then we measure out a series of 50 c.mm. volumes of defibrinated blood and introduce into each of these (from a calibrated capillary pipette drawn out at the extremity into a fine point) 2·5 c.mm. of one of the dilutions of our culture. Then after thorough mixing we introduce the implanted blood into one of the compartments of our slide cell. In preparation for this, the edges of the slide cell are re-sterilised by passing them through the flame, and the upper slide is pushed back a little so as to leave a projecting lower lip upon which to rest the point of the pipette which purveys the blood. When the compartments of the slide cell have been filled in with the allocated volumes of blood, the upper slide is brought back into position and the ends and sides are carefully sealed up by brushing them over with very hot melted paraffin wax. After 24 hours' incubation the staphylococcus colonies show up against the scarlet background of the blood by a surrounding dark purple discoloration. Then after a few more days this purple fades out and each colony is represented by a small bleached patch. (Figs. 2, A and B.) When instead of implanting into defibrinated blood we implant into a blood which coagulates in the slide cell, an additional feature arrests the attention. Each colony is encompassed by a ring. It is just as if we had taken an agar plate upon which staphylococcus colonies are growing, and a cork borer of much greater diameter than these, and had then, centring upon the colonies, cut into the medium and then withdrawn our cutting implement. It may be taken that the rings which encircle the staphylococcus colonies in the blood delimit the regions in which the fibrinous network has been digested by tryptic ferment generated either by the microbes or by the leucocytes which have gathered round them.

Reverting to the more general consideration of the measurement of hæmobactericidal power, it will be well before passing on to appreciate that the

opportunity for phagocytosis afforded in the quiescent blood in vitro is certainly much greater than that afforded in the circulation. In that swift torrent the leucocytes have as little opportunity for ingestion as would fish if, instead of facing upstream, or swimming down faster than the current, they were only passively swept along side by side with all other flotsam. In the tranquil conditions provided in vitro the leucocytes will be able to congregate round their bacterial prey.

FIG. 2.—A.

Normal blood implanted with staphylococcus, showing the colonies which appear after 24 hours' incubation.

B.

Blood from a patient with streptococcic septicæmia implanted and cultivated exactly as above.

Methods of Measuring the Phagocytic Power of the Blood.—We may here add one volume of the microbic suspension to two volumes of defibrinated blood[3]—or, following out the opsonic technique more closely, we may take one volume of washed corpuscles from the blood that is to be tested, one volume of serum, and add one volume of the microbic suspension.

Methods of Measuring the Sero-Bactericidal Power.—Here, as in connexion with the whole blood, we have two methods at our disposal. We can, using the procedures described above in connexion with blood, implant and then explant. When dealing with sero-phytic microbes, in particular with the staphylococcus, we can also implant and inculture, filling our serum into fine capillary tubes and incubating in these.[4] (Fig. 3.) By this method we obtain, as is seen in the figure, quite compact and separate colonies. The number of these will, of course, correspond, in the case of a non-bactericidal serum, to the number of microbes implanted; and in the case of a bactericidal serum to the number of microbes left alive. We can accordingly by this procedure compare the bactericidal potency of two sera, and we can for further control in such measurements count also the colonies which develop in nutrient broth. But in the case of broth we must, because of the diffuseness of the colonies, limit ourselves to implantations of less than 100 microbes per 50 c.mm. volume, and must employ capillary tubes of such fineness that a 50 c.mm. volume may occupy a length of not less than 25 to 50 cm.; and above all, we must very carefully avoid all mechanical disturbances.

EXPERIMENTS: GRADUATED IMPLANTATIONS OF LIVING MICROBES INTO BLOOD IN VITRO.

Inculturing Experiments.—We may now, leaving till later what requires to be said about the remaining methods of blood testing, study what happens when we make graduated implantations of living microbes into blood. And it will here, as in all experimentation, be well to visualise and formulate quite clearly in advance what we expect will happen; for then both such results which conform exactly, and those which are at variance with expectation, will engrave themselves more deeply upon the mind.

Here, if anyone were required to say a priori what would follow upon making graduated implantations of living microbes into blood, he would assuredly say that as fewer and fewer microbes were added to blood a larger and larger percentage, and after a certain point a full 100 per cent. of the added microbes would be killed. Similarly he would predict of such graduated implantations that as more microbes were added the percentage of survivors would go up in a perfectly regular manner. The next step will be to see what does actually happen. Here a distinction has to be made between blood and blood. And I would ask you to let me tell you first what happens when I take my own blood and implant into it graduated quanta of microbes. I begin with my own blood because it so happens that this, by virtue of its having a subnormal number of leucocytes, and serum which has very little bactericidal action upon the staphylococcus, furnishes a specially favourable object for the experiments here in view. One of many dozens of quite conformable experiments made with the blood is set out in tabular form (Table I.). This particular experiment was carried out in duplicate by separate observers. The results of both workers are given.

It will be seen that we have here, with implantations of 10,000 to 150 staphylococci per c.cm., an average killing of 78·8 and 76·3 per cent. respectively; and with implantations below 150 staphylococci per c.cm. no killing at all—in other words with moderate implantations an average survival of 22 per cent., and with quite small implantations a survival of a full 100 per cent. These figures, I think, tell their tale quite plainly. Their import, as I read it, is that we have in the blood an apparatus for primary and an apparatus for secondary defence—aphylactic and epiphylactic machinery. The former—making use, we may take it, of phagocytic action, and where the serum is naturally bactericidal, also of sero-bactericidal action—would deal (according to circumstances more or less effectively) with small bacterial implantations and septicæmic sub-infections. The machinery for epiphylactic defence—making use, as we shall see, of anti-bacterial elements given out by the leucocytes when these are incited by antigen—would deal with larger bacterial implantations and graver blood infections.

FIG. 3.—Measurement of sero-bactericidal power. Staphylococci implanted into serum growing out into discrete colonies.

[3] Wright and Colebrook: Technique of the Teat and Capillary Tube, second edition, Constable, 1921.

[4] The method of culture in capillary tubes was employed nearly 50 years ago by Salomonsen for the isolation of microbes from putrid blood.

Interpreting now in the light furnished by this conception, the results set out in Table I., we see that in this blood the machinery of primary defence is quite singularly inefficient, while that of secondary defence is far more efficient. The blood, implanted

TABLE I.

Implantation of graduated dilutions of staphylococcus culture into 40 c.mm. volumes of A. E. W.'s defibrinated blood. The figures represent the number of staphylococcus colonies which developed after 24 hours' incubation in slide cells.

Observer, A. E. W.				Observer, L. C.			
Implantation per c.cm. of blood.	Number of microbes implanted (I.) and colonies found (F.) in 40 c.mm. of blood.		Percentage of survivors.	Implantation per c.cm. of blood.	Number of microbes implanted (I.) and colonies found (F.) in 40 c.mm. of blood.		Percentage of survivors.
	I.	F.			I.	F.	
8400	336	64	19	9600	384	74	19
4200	168	28	17	4800	192	44	23
2100	84	24	28	2400	96	27	28
1050	42	7·5	18	1200	48	13	27
525	21	11·5	55	600	24	15	63
262	10½	5	50	300	12	6	50
131	5	5	100	150	6	5	100
66	3	7		75	3	5	
33	1·5	1·5		38	1·5	2	
—	671	153	22·8	—	766	191	24·9

21·2 (Observer, A. E. W.) 23·7 (Observer, L. C.)

It may be added here that precisely similar results are obtained when instead of, as in the tabulated experiments, implanting progressive dilutions of a bacterial suspension into separate samples of blood, we modify the procedure either (*a*) by implanting heavily into a volume of blood and then progressively diluting down this implanted blood with unimplanted, sampling it after each dilution; or (*b*) by making repeated small implantations into one and the same volume of blood, sampling it after each successive implantation.

with 33 microbes per c.cm., cannot kill one; when implanted with 10,000 per c.cm. it can kill 2000. This increased efficiency plainly indicates that an *epiphylactic response* has been evoked; and whenever we speak of the bactericidal action of the blood we must distinguish sharply between what the blood does where epiphylactic response is evoked and what it does where such a response is not evoked; and we should, when dealing with microbic implantations and infections, distinguish between a sub-vaccinating, a vaccinating, and a critical or optimum vaccinating dose.

But to interpret and generalise safely, we must regard not only bloods which have a feeble, but also those which have a powerful machinery of phylactic defence. When we take a blood which has a full complement of leucocytes, and a serum which has an appreciable bactericidal power, and make into this graduated implantations of staphylococcus, quanta up to 1000 and more per c.cm. are killed without residue; and with heavier implantations we have incomplete destruction—with (for this would seem to be the rule) first an increasing, then a diminishing, and after that again an increasing, percentage of survivors. With implantations of 10,000 to 20,000 staphylococci (these would, in case of powerfully bactericidal bloods, seem to be optimum implantations) we may have as few as 1 to 2 per cent. of survivors.

It will, on reflection upon the technical aspect of the question, be realised that with slide cells clear demonstration of epiphylactic response will, in the case of these powerfully bactericidal bloods, be difficult. A preliminary difficulty is created by the circumstance that with the heavier implantations which are here necessary accurate enumeration of the colonies becomes (owing to their crowding) impossible. A second difficulty is created by the fact that when we have instead of a nearly zero base line, a high base line of phylactic power, epiphylactic response can no longer show up clearly. And yet a third difficulty is created by the fact that instead of obtaining, as before, with vaccinating implantations, a bactericidal effect due wholly to epiphylactic response, we obtain, where the primary apparatus of defence is efficient, a result which is due in part to the factor of phylactic and in part to the factor of epiphylactic action.

These difficulties can be diminished by reducing the phagocytic power of these powerfully bactericidal bloods. Instead of working with the normal proportion of serum to corpuscles which obtain in defibrinated blood, we can by diluting down the blood with additional serum, work with an increased proportion of serum and a diminished proportion of leucocytes. Or, again, we can, by incubating our defibrinated blood for half an hour in fine capillary tubes, deplete it of leucocytes. Or finally, by using a combination of these methods we can obtain a blood which is both impoverished in leucocytes and diluted with serum. Such a blood will still, in that its serum exerts a bactericidal action on staphylococcus, differ from a blood of feeble phylactic power. But it will, in despite of that, behave very similarly. Small implantations will no longer be killed off without residue, and we obtain with geometrically diminishing implantations, a characteristically prolonged cauda of survivors.

Fixing our attention upon this cauda, let me explain to you how we can, where we have before us a table which sets out the results obtained from geometrically diminishing implantations of microbes, tell whether epiphylactic response has or has not been evoked. Here I would beg you—for this will greatly facilitate my exposition—to let me call the first figure in any column of implantations or results the *caput*, and all the figures which follow, the *cauda*. You will now on turning to Table I. and looking at the column of implantations see that the number of microbes in the caput must always exceed by a fraction (a fraction which corresponds to the number of dilutions) the total of microbes in the cauda. If now in the column of results we find the number of colonies in the caput sensibly the same as that in the cauda, the conclusion will clearly be that the bactericidal efficiency of the blood does not vary with the magnitude of the implantation. If the colonies in the caput much outnumber those in the cauda, the inference is that the bactericidal efficiency of the blood increases as the implantation is reduced. (Let it be remarked that it would inevitably do so if the serum exerts a bactericidal action.) But if the colonies in the caput are definitely outnumbered by those in the cauda we may—provided

TABLE II.

Experiment showing that when geometrically diminishing numbers of microbes are implanted into a powerfully bactericidal blood, and into the same blood diluted with serum, the serum-diluted bloods give a longer cauda of colonies, and that in the diluted bloods the cauda furnishes more colonies than the caput.

Number of living staphylococci implanted into the 50 c.mm. samples of blood.	Number of colonies of staphylococcus which developed in—			
	Undiluted blood.	Blood diluted—		
		With half its bulk of serum.	With its own bulk of serum.	With double its bulk of serum.
100	1	3	4	3
50	0	1	3 (?)	5
25	0	1	1	5
12	1	0	1	1
6	0	0	0	0

always that the microbes in the first blood sample are not so numerous as to interfere with each other's development—confidently conclude that the bactericidal efficacy of the blood increases as the implantation is increased; in other words, that epiphylactic response has been evoked. And by going down the column of results in a methodical manner, comparing the number of colonies in each successive blood sample with the total for the two or three samples next in series, it will be possible to detect the point at which epiphylactic response comes in.

Employing these criteria in connexion with the results obtained from a powerfully bactericidal blood diluted down with serum, we see that evidence of epiphylactic response is here obtained. (Table II.)

Having now seen that bloods of powerful phylactic power when diluted respond after the manner of undiluted bloods of feeble phylactic power to larger bacterial implantations by increased bactericidal action (and all our other methods of testing epiphylactic response will bring confirmation of that) we shall, perhaps, do well before proceeding further to make a general survey of the field of bacterial infections, and see whether the doctrine of phylactic and epiphylactic defence enumerated above accords with the events which come every day under clinical observation.

Three types of cases should be called to mind :—

1. The type of infection (exemplified by streptococcic endocarditis) with for a long time only very few microbes in the blood, with only moderate pyrexia, comparatively little constitutional disturbance, and a protracted and almost always fatal course. These cases would well be explained by assuming that the machinery of first defence has failed to do its office and that the epiphylactic machinery has never been called into action.

2. The type of case (exemplified by croupous pneumonia) with from the outset an intense infection, high temperature, and heavy bacterial intoxication, and a course which very rapidly terminates either in death or in recovery by crisis. The cases which recover would be well explained by assuming that the epiphylactic machinery is here effectively, though tardily, brought into operation; those cases which terminate fatally, by supposing the epiphylactic machinery to have been put out of action by overwhelming bacterial intoxication.

3. The type of infection where we have either a regular hectic temperature, as in phthisis and locked-up suppuration, or else such steep ascents and descents of temperature as accompany the rigors of acute streptococcus septicæmias. Here we may assume—and such opsonic and bactericidal observations as are to hand are in accord with this—that whenever bacterial poisons in sufficiency are conveyed into, or as the case may be, generated in the blood, the machinery of epiphylactic defence is, with results that are for the immediate moment satisfactory, called into action.

When once we survey the phenomena of infection from the point of outlook here suggested, the question arises in the mind whether in all these cases it might not be possible to bring the machinery of epiphylactic defence into effective operation by a direct introduction of vaccine into the blood. The proper dose to inoculate here would, of course, be that quantum (I might, perhaps, call it the critical dose) which would, taken together with the bacterial elements already in circulation, evoke in the patient's blood a maximum response. If the epiphylactic response to infection could in this way be expedited and reinforced, three advantages would be gained. First, the poisoning of the leucocytes—poisoning which upsets the machinery of both phagocytic and epiphylactic defence—would be avoided. Secondly, the patient would be spared that intense systematic poisoning which may bring him near to death before the life and death struggle with his infection even begins. And thirdly, the patient would be spared all that grave damage which is inflicted on his tissues at the site of infection.

IMPLANTATIONS OF DEAD AND LIVING MICROBES INTO THE BLOOD IN VITRO.

Inculturing Experiments.—Coming back to our experiments, we may consider next the effect of introducing into the blood instead of only living microbes a proportion of dead and a proportion of living microbes: (1) The dead may be implanted into the blood first and afterwards the living. That will be comparable to prophylactic inoculation undertaken with a vaccine of dead microbes, and followed by either a test implantation of living microbes or exposure to infection. (2) Or again the dead and the living microbes may be implanted into the blood simultaneously. (3) Or lastly—and this will be analogous to inoculation in the incubation period and to vaccine-therapy—the living microbes may be implanted first and afterwards the dead.

Let me put off for a moment telling you of the results obtained. For we must first clarify our ideas and see whether there is really a definite line of division between vaccinating and assaying, and ask ourselves whether we have a perfectly clear idea as to what we mean by a vaccinating and an assaying or test dose. These will probably seem to you to be perfectly idle questionings, and you will, perhaps, think that they could be settled straight off, by defining the *vaccinating dose* as that which comes first in order of time, which evokes the epiphylactic response, and which normally consists of dead microbes; and the *assaying dose* as that which follows after, which consists of living microbes, and which finds out what epiphylactic effect has been obtained. In reality, however, these definitions do not go down to the root of things, and they regard only prophylactic immunisation.

When we pass to the case of inoculation in the incubation period and to vaccine-therapy, the terms vaccinating dose and test dose must, it will be allowed, be interpreted somewhat differently. The living microbes which have effected a lodgment in the body here officiate as the test dose, and the dead microbes which are subsequently inoculated, as the vaccinating dose. But here it may still be maintained that vaccinating and assaying are operations apart, and that here only the order of the doses has been changed. When, however, we come to the experiments in which an epiphylactic response is evoked by importing living microbes into the blood, it becomes plain that the distinction between vaccinating and assaying can no longer be sustained. For we have here not two separate and independent operations, but a single and indivisible vaccinating and assaying operation. And, of course, the same holds good of septicæmic infections. There the infecting microbes are the agents which produce, as the case may be, epi- or, as the case may be, apo-phylactic response, and they officiate at the same time as indicators of the changes effected.

There is still, in connexion with this subject, one further point that requires to be considered, and it is one which has already been adverted to. We saw in connexion with the discussion of dead and living vaccines that it is not the dead or living microbes as such, but soluble elements extracted from the bacteria which officiate as the antigen, and we further saw that such soluble elements are extracted irrespectively of the bacteria being living or dead. It follows that where (1) dead and living bacteria are implanted simultaneously or in succession into the blood, or (2) living microbes (in the form of abortive infections or test doses) are introduced into an organism already vaccinated, or (3) dead microbes are inoculated into an already infected organism, all the microbes, irrespectively of their being dead or alive, will make their contribution to the final result. And especially in connexion with therapeutic inoculation it will be important to observe that the really operative dose—the dose which, as the case may be, produces an epiphylactic or apophylactic effect—will in each case be the amount of antigen introduced in the vaccine, supplemented by that contributed by the infecting microbes.

This is the rationale of well-established rules—of the rule that in prophylactic operations we may, because here the active principle supplied from without will not be supplemented from within, employ a considerable dose of vaccine; and of the rule of therapeutic inoculation, that we must carefully consider the volume of infection, so as to introduce, as a larger quotum is supplied from within, a smaller quotum in the form of vaccine; and again of the rule that we should abstain from inoculation where a hypervaccinating dose is already circulating in the blood.

But though it is important to realise that when it is merely a question of furnishing antigen, dead microbes can take the place of living and vice versa, we must not allow ourselves to forget that, except only in the matter of furnishing antigens, the dead microbes which are introduced in vaccines stand on an absolutely different footing to the living microbes which produce the infection. The principles are in reality very simple. The dead microbes provide our therapeutic

agent, but the living decide the issue. Upon the doses of vaccine administered will depend the magnitude of the vaccinating response, but the effectiveness of that response will, both in prophylactic and therapeutic procedures, depend upon the number of living microbes that have to be dealt with. We shall see that precisely the same holds also in vitro. It is essential to regulate the total of antigen which is brought into operation. But more important still is it to keep within certain limits the number of living microbes we implant in the assaying dose.

Three other points in connexion with experiments in which dead and living microbes are implanted into blood must also be kept in mind in connexion with every one of the experiments which I have cited and am about to cite. The *first* is that in what are designated living cultures there is always a variable and therefore unknown proportion of dead microbes. The *second* is that from the point of view of the evocation of physiological effects we must not range in the same category of efficacy all kinds of dead microbes or, as the case may be, all sorts of living microbes. To take the case of dead microbes, some like typhoid bacilli which have been killed at 56° C. readily dissolve in serum, and to a less extent in watery media. Others like typhoid bacilli, which have been heated above 72° C., are comparatively insoluble, and furnish vaccinating elements which are not only less in quantity, but also presumably less efficacious. And the *third* point to be borne in mind is that in vaccinating we are dealing, not as in ordinary chemical operations with reagents which are fully dissolved, but with substances which may sometimes fail to pass into solution, and may at other times pass into solution very slowly. It is in conformity with this that a dose of vaccine should sometimes give a blank result, and at other times, especially when inoculated intravenously, first a positive and afterwards a negative phase. Let me now show you the results of some experiments in which dead and living microbes were implanted into defibrinated blood in vitro.

EXPERIMENTS SHOWING THAT INCREASED HÆMOBACTERICIDAL EFFECT IS OBTAINED BY VACCINATING BLOOD IN VITRO.

Below are subjoined first the result of two experiments conducted on my own blood.

Effect of Implanting Dead and Living Microbes into Blood.

Here the dead and living of microbes were implanted simultaneously into 25 c.mm. volumes of blood and the implanted blood was afterwards filled into and incubated in fine capillary tubes.

Experiment 1.

Test dose.*	Vaccinating dose.†	Aggregated implantation.	Negative or positive result of culture.
Living staph. per c.cm.	Dead staph. per c.cm.		
Circ. 2,000	32,000	34,000	+
,,	,,	,,	+
,,	16,000	18,000	+
,,	,,	,,	+
,,	8,000	10,000	+
,,	,,	,,	+
,,	5,000	7,000	0
,,	,,	,,	0
,,	4,000	6,000	+
,,	,,	,,	+
,,	2,000	4,000	+
,,	,,	,,	+
,,	Nil	2,000	+
,,	,,	,,	+
,,	,,	,,	+

Staph. = staphylococci.

* 1 wash of a dilute suspension of living staphylococcus.

† 1 wash or a multiple or submultiple of a sterilised 8-fold stronger staphylococcus suspension.

Details of the Bacterial Enumerations upon which the Figures in the Above Table are Based.—The staphylococcus suspension which furnished the test doses was further diluted 10-fold, and of this a wash or a submultiple of a wash was implanted and incultured in 25 c.mm. volumes of my serum.

1 wash gave 5 colonies.
1 ,, ,, 5 ,,
½ ,, ,, 3 ,,
¼ ,, ,, 1 colony.

There being thus in 1 wash of the diluted culture used for this enumeration an average of 5 microbes, there would be in 1 wash of the suspension which furnished the test dose 50 microbes. And this (seeing that 25 c.mm. of blood were in each case employed) works out as an implantation of 2000 (50 × 40) staphylococci per c.cm.

Experiment 2.

Here a precisely similar technique was employed.

Test dose.	Vaccinating dose.	Aggregate implantation per c.cm.	Number of survivors per c.cm.
Living staph. per c.cm.	Dead staph. per c.cm.		
1,200	12,000	13,200	363
,,	,,	,,	
,,	6,000	7,200	48
,,	,,	,,	
,,	4,000	5,200	180
,,	,,	,,	
,,	3,000	4,200	462
,,	,,	,,	
,,	Nil.	1,200	200
,,	,,	,,	
,,	,,	,,	

Experiment 3 shows a quite dramatic result obtained with a blood which was *ab origine* one of great bactericidal power.

Experiment 3.

Here the vaccine of dead staphylococci was implanted in vitro into defibrinated blood. The vaccinated blood was kept on the bench and then after three-quarters of an hour graduated dilutions of living staphylococci were implanted—the volume of staphylococcus suspension being always 2·5 c.mm. in 50 c.mm. of blood. After implantation the blood was filled into slide cells and incubated.

Variety of blood into which living microbes were implanted.	Number of microbes per cent. which developed from an implantation of—							
	20,000	10,000	5,000	2,500	1,250	600	300	150
	living staph. per c.cm.							
Unvaccinated blood	7·4	5·2	6	5	16	6·6	0	0
Blood vaccinated with—								
12,000 staph. per c.cm. ..	1·5	1·4	0·8	1·6	1·6	3·2	0	0
6,000 dead staph. per c.cm. ..	0·6	0·4	0 8	0·0	1·6	3·3	7	0
3,000 dead staph. per c.cm. ..	6·1	1·6	5·2	8	1·6	3·2	0	0
1,500 dead staph. per c.cm.	5	5·4	5·6	6	1·6	3·2	0	0

Details of the Bacterial Enumeration upon which the Figures in the Table are Founded.—Here in each case 2·5 c.mm. of the 32-, 64-, and 128-fold dilution of the bacterial suspension used for the strongest implantation was incorporated into 50 c.mm. of serum, and then incultured. The number of colonies which developed in the serum implanted with the 32-, 64-, and 128-fold dilutions were respectively (the counting operations being conducted in duplicate) 31 and 30, 18 and 19, and 6 and 7. This (taking the first figures) works out as (30 × 20) an implantation of approximately 600 living staphylococci per c.cm. in column 6 of the table.

Attention may here be directed to three points:—

1. All the vaccinated bloods kill here all along the line more microbes than the unvaccinated blood, the best results being in this particular case obtained with blood vaccinated with 6000 dead staphylococci. This blood in the case where 20,000 living staphylococci were implanted killed off per c.cm. 1360 more staphylo-

cocci than the unvaccinated blood; and it killed off without residue 2500 as compared with 300 staphylococci.

2. The second point is one of general theoretical importance. When comparable numbers of microbes are employed, these being, in the one case, all derived from a living culture, and, in the other case, in part from a living and in part from a sterilised culture, better results are in every case obtained with the blend. Thus, for example, we have in column 1 with an aggregate implantation of 20,000 living staphylococci a percentage survival of 7·4, and in column 2 with an aggregate implantation of 22,000 staphylococci, consisting of 12,000 dead and 10,000 living, a percentage survival of 1·4; and again, we have in column 2, with an aggregate implantation of 10,000 staphylococci a percentage survival of 5·2, and in column 3, with an aggregate of 11,000 staphylococci, consisting of 6000 dead and 5000 living, a percentage survival of 0·8. It would thus seem—but one must be cautious in inference, because there are no cultures which contain only living microbes—that dead microbes are, micro-organism for micro-organism, more efficacious than living; and that vaccines of sterilised cultures should be preferred to living vaccines, not only because their use is unassociated with risk of infection, but also because they are superior in quality.

3. The third point is also of fundamental interest. And it is a point that has already been considered. When in our assaying operations we introduce microbes into the whole blood or into a serum or pus fluid which contains leucocytes, or even, as in the opsonic technique, into an artificial mixture of washed leucocytes and serum, the microbes we implant may, despite of our having implanted them solely for the purpose of testing, evoke (this will depend on their number) a secondary epiphylactic response which will give increased anti-bacterial power such as is presumably achieved when slighter infections supervene upon a prophylactic procedure. Or again, the microbes we implant for the purpose of testing may, like really graver infections supervening upon a prophylactic procedure, get the better of the blood resistance, and eat up, or more than eat up, the surplus of anti-bacterial power furnished by the original vaccinating operation. It will, in view of these superadded effects, be very difficult to assess the actual achievement of the prior vaccinating operation. Apparently the best that can be done in the way of assessment will be to get the leucocytes out of the way before we undertake our tests, and content ourselves with measuring the bactericidal and opsonising power of the serum. Consideration of the effect produced by the intravenous inoculation of vaccines upon the hæmobactericidal power may with advantage be postponed until the argument of this lecture has been a little further developed.

IMPLANTING AND EXPLANTING EXPERIMENTS.

Up to the present we have been studying the results obtained by implanting living microbes separately or associated with dead microbes into the blood and inculturing. This method measures the destructive power of leucocytes and blood fluids operating in conjunction. But while it tells us what number of microbes are killed it tells us nothing about the pace of destruction, and nothing even indirectly about the agency by which the microbes are destroyed. And again the inculturing method has a definitely limited range of utility. For when over, let us say, 60 colonies develop in 50 c.mm. of blood accurate enumeration begins to become difficult. The implanting and explanting method supplies what is wanted in these respects. It will be proper first of all to satisfy ourselves that the general results obtained by this method are conformable to those obtained by inculturing. And, inasmuch as we are here specially concerned with the verification of the proposition that epiphylactic response can be evoked in the blood in vitro, and is evoked only when we implant sufficiently heavily, it will be well to first study my blood whose feeble phylactic power makes it specially well adapted for the institution of experiments on epiphylactic response.

In these implanting and explanting experiments implantations of 2·5 c.mm. volumes of graduated dilutions of a suspension of living staphylococci were made into 50 c.mm. volumes of A. E. W.'s defibrinated blood. Then samples were taken from each implanted blood, and these were first diluted 25-fold and then spread out over the surface of agar plates. The first samples were explanted instantaneously—instantaneously being here understood to mean instantaneously after the blood and microbes had been duly mixed—and the other samples after longer intervals. The implanted bloods were in each case kept not in the incubator but at the temperature of the air.

Experiment A.

Blood vol.	Number of living staphylococci implanted— per c.cm. of blood.	per 2 c.mm. of blood.	Number of colonies which developed from that volume explanted after the stated interval. 0′	30′	60′	120′	Number of staphylococci implanted into the samples.		Number of colonies which developed out of those samples.	
1	16,500	33	26	20	27	23	132	264	96	148
2	11,000	22	12	6	11	—	66		29	
3	5,500	11	8	2	3	5	44		18	
4	2,750	5·5	2	1	1	1	22		5	
5	920	1·9	1	2	2	1·5	7·6	11·65	6·5	10
6	460	·9	1	0·5	0	1·5	3·6		3	
7	230	·45	0	0	0	0·5	·45		0·5	

Experiment B. (The same technique was employed.)

Blood vol.	Number of living staphylococci implanted per c.cm. of blood.	Bactericidal effect in sample explanted immediately.	Bactericidal effect in the four samples explanted within three hours.		
1	12,000	22 reduced to 8	90	184 reduced to 42	15
2	8,000	15 ,, 10	60		15
3	4,000	7·5 ,, 0	22·5		5
4	2,000	3·75 becomes 5	11·5		7
5	800	2·25 ,, 2	7·75	14·5 becomes 16	8
6	546	1·5 ,, 2	4·5		5
7	270	0·75 ,, 0	2·25		3

Experiment C. (Again the same technique is employed.)

1	5,400	10·8 reduced to 5	43	57·5 reduced to 25	18
2	1,800	3·6 ,, 1	14·5		7
3	360	0·75 becomes 1	3	4 becomes 3	3
4	170	0·25 ,, 0	1		0

It will be seen that the conclusions which were reached by the inculturing method are here all confirmed. We again arrive at the result that the particular type of blood here in question exerts no bactericidal effect when only small numbers of staphylococci (1000 per c.cm. and fewer) are implanted, and that it exerts a very conspicuous effect when larger numbers of staphylococci are introduced. In the three experiments here set out there is with the smaller implantations no killing whatever, and with the larger implantations an average killing of 60 per cent.

Experiment D.

Here 7·5 c.mm. of an enumerated staphylococcus culture was implanted into 300 c.mm. of A. E. W.'s defibrinated blood and immediately afterwards a 30 c.mm. sample was explanted on to an agar plate. That done another 7·5 c.mm. of the staphylococcus suspension was implanted, and immediately another 30 c.mm. sample was explanted—the same procedure being followed throughout.

Number of staphylococci implanted per c.cm. of blood.	Number implanted in the 30 c.mm. of blood used for explantation.	Number of colonies which developed from that 30 c.mm. of blood.	Percentage of survivors.
400	12	11	99
840	25	10	49
1,310	40	—	—
1,850	56	18	32
2,450	75	26	34
3,125	100	17	17
4,625	140	48	29
6,300	190	69	31
8,150	245	108	44
10,250	310	148	48

The figures for the implantations were obtained by enumerating the staphylococcus suspension in 50 c.mm. volumes of serum. An implantation of 2·5 c.mm. gave 44 colonies, one of 7·5 c.mm. 140 colonies, and one of 10 c.mm. 135 colonies, giving a total of 319 colonies in the 20 c.mm. of suspension implanted. This works out as 16 staphylococci in 1 c.mm., and 12 in 0·75 c.mm., the volume of the bacterial suspension in the 30 c.mm. of blood used for the first explantation.

Further, these experiments bring out—and this is their new contribution—that of the total of microbes killed by the blood the larger proportion (here two-thirds of those killed) are killed instantaneously.

Let me in connexion with this make clear the following points: (1) Subitaneous killing of microbes is obtained practically invariably. Where it fails to occur that may perhaps depend upon the antigen not being brought into solution. (2) The fact that microbes can be killed instantaneously by the evoking of epiphylactic response has, as we shall presently see, very important practical applications in connexion with the treatment of bacterial disease. (3) The fact that microbes are killed instantaneously and at ordinary temperatures throws important light on the mode of bacterial destruction and on the nature of epiphylactic response. If we had had to depend here only upon the inculturing method we might perhaps have supposed that the implanting of a sufficient quantum of microbes led to an activation of the machinery of phagocytosis. But when we learn, as we do from these experiments, that microbes are killed instantaneously at temperatures at which phagocytosis begins only after very appreciable delay, we are compelled to conclude that subitaneous killing cannot be due to phagocytosis. It must therefore perforce be attributed to a bactericidal action of the serum.

The generalisation that subitaneous killing of microbes in the blood is due to a bactericidal action exerted by the serum furnishes in its turn a new articulating point upon which a further framework of generalisations can be assembled. From the fact that the blood can kill microbes instantaneously it can be inferred that a bactericidal serum also must be competent to kill instantaneously. Further, when we have realised that the serum receives, when we vaccinate the blood, a quite sudden access of bactericidal power, and when we reflect that where massed leucocytes washed free from serum are imposed upon agar implanted with staphylococci or streptococci, these [5] last are killed extracellularly and by chemical agency, we are almost inevitably conducted to the conclusion that the bactericidal elements found in vaccinated bloods are derived from the leucocytes, and that leucocytes can, under the influence of a vaccinating dose of microbes, instantaneously export their antibacterial elements into the surrounding blood fluids.

We shall, as we proceed, see all of these inductions confirmed by actual experiment. But here another issue must take precedence. I have already elsewhere [6] shown that when epiphylactic response is evoked by adding vaccine to blood the serum becomes bactericidal, or as the case may be, more bactericidal, not only to the species of microbe which has furnished the vaccine, but also to many non-homologous microbes. This does not stand by itself. It would seem that all the antibacterial elements that are brought forth in the blood—and it will presently appear that opsonic substances also are generated—are polytropic.

It is unnecessary to say much in the way of general comment on the fact that the antibacterial substances here in question are polytropic. For while established notions prejudice us against the idea of vaccination conferring a non-specific protection, reflection puts out of court all alternative suggestions. In the first place, where the blood kills microbes instantaneously there is time for delivery but not for manufacture of anti-bacterial elements. And again, it is much more difficult to conceive that the leucocytes should have stored up in their protoplasm special monotropic bactericidal substances and opsonins for each and every description of microbe than to conceive of the leucocytes being furnished with a common store of polytropic antibacterial elements which could be brought into operation upon all microbic invaders without distinction of species.

And in this connexion something further may be added. When once we have pictured to ourselves that non-specific anti-bacterial substances can, under the stimulus of any antigen, be exported from leucocytes, it does not perhaps involve a much more adventurous flight of imagination to conceive that an effective vaccinating stimulus might be supplied to the leucocyte by chemical agents other than bacterial antigens. Certain clinical and also some experimentally established facts would very well harmonise with such a conception. Here would come the fact that emetin, though not directly nocuous to the *Amœba histolytica*, can rid the intestine of that infection. To this might be added the fact that salvarsan can in syphilis, complicated with a heavy streptococcic infection, very rapidly rid the body of the latter—a fact which should be brought into the same visual field with the observations of S. R. Douglas and L. Colebrook, which establish that after salvarsan and neosalvarsan injections the blood becomes for a period of a few hours bactericidal to streptococcus and staphylococcus. And again, there might be added the observations of Walbum,[7] which show that the yield of diphtheria antitoxin and of agglutinins to the *Bacillus coli* can be very appreciably increased by the exhibition of manganese chloride and other metallic salts.

(To be continued.)

[5] Wright, Fleming, and Colebrook: Sterilisation of Wounds by Physiological Agency, THE LANCET, June 15th, 1918; Wright and Colebrook: Technique of the Teat and Capillary Tube, pp. 279–283.

[6] Wright: Lessons of the War, THE LANCET, March 29th, 1919.

[7] Communications de l'Institut Sero-thérapique de l'État Danois, tome xii., 1922

THE CLINICAL RESULTS OF THE TREATMENT OF MALIGNANT DISEASE BY X RAYS.*

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WITH reference to the value of statistics Mr. James Berry, in his recent address on the Progress of Surgery, said: "We sometimes hear of the mortality of such and such an operation. There is no such thing. The mortality depends on the condition for which it is done, upon who does it, and when it is done." Much the same may be said of X ray treatment and its results. The aim of radiation treatment in different cases may be prophylactic, or palliative, or curative, and the results of each should form a separate statistical group. Cases treated by prophylactic radiation in collaboration with the surgeon should certainly form a separate group, subdivided according as the radiation is given before the operation or after, or both. The results of palliative radiation after many incomplete operations or in inoperable cases (and, perhaps, the majority of cases at present referred to the radiologist are in this group) should be considered apart. In only a small proportion of the cases referred to us can we make an attempt to arrive at a definite cure.

Superficial Basal-Celled Epitheliomata.

In this third division (curative aim) the majority of cases are those with superficial epitheliomata of the "basal-celled" type. Here, as in malignant disease elsewhere, if a wide enough area be removed or destroyed, by excision or curette and caustics, the result in a very large percentage of cases will be cure.

* Based on a contribution to a discussion on the subject at the Medical Society of London, Jan. 22nd, 1923.

But in rodent ulcer excision is often not wide enough for cosmetic reasons, thus in a number of supposedly successful excisions McKee has cut serial sections of the whole excised tissue, and found that the disease extended right to the margin of the incision. He suggests that such an examination might be done in all surgical cases, and radiation applied afterwards if indicated. The results with X rays or radium (McKee regards these agents here as of equal value) give better cosmetic results than do surgical measures, and the percentages of clinical cure are as high or higher; McKee out of 644 cases reporting 91 per cent. cure, Wetterer 96·2 per cent. out of 852 cases, Meyer 99 per cent. without recurrence. McKee usefully analyses his causes of failure, which are worth consideration, as they also apply to X ray work in other areas. Apart from non-attendance of the patient for further treatment, or very advanced and practically hopeless condition on commencing treatment, his chief causes of failure were technical—i.e., failure to give sufficient radiation to the deeper strata of cells so that recurrence took place in the depth, or failure to radiate a wide enough area beyond the visible and palpable extent of the lesion. The latter must be a common source of imperfect results in deep-lying growths, of whose extent we must often remain ignorant by clinical means. Stiles and Handley have shown the very wide extent of breast invasion, and many other apparently localised deep malignant lesions must also extend widely. Failure is sometimes due to marked resistance to radiation, but this is most usually observed when long-continued fractional doses of radiation have been given. This fact was recognised as far back as 1904 by Kienböck and Belot, who even then favoured "intensive" methods, and its importance has recently been specially emphasised by Regaud, who has shown how prolonged fractional methods of treatment produce in the successive generations of malignant cells an "auto-vaccination" against radiation. Regaud says: "The conception of the more or less rapidly weakening efficacy of successive treatments is fundamental; it should dominate the radiotherapy of cancer." Inadequate or wrong method of dosage, then, in some way or another, McKee finds the chief cause of failure. Finally, he points out that inadequate observation of cases is a frequent cause of failure, and advises that after an apparent clinical cure the patient should report for an examination every six months for five years; only in this way can recurrences be checked in time.

Squamous-Celled Epitheliomata.

The results in squamous-celled epitheliomata are not as good as those already quoted, owing to the frequent early wide invasion, and the primary is a more resistant type, more intense doses being needed, Bordier recommending up to 26 H. in single doses. Brock has reported excellent results with doses not quite so large as this. Of 68 inoperable face cases Wetterer had clinical cure in 34, of 34 lower-lip cases a clinical cure of 25 (73 per cent). Shepherd, using Broders' histological classification, has grouped the results of lip cases into four series as regards malignancy. When the cells are most differentiated the results of surgery or radiation are excellent. In the 1 or 2 per cent. where undifferentiated cells predominate the results appear to be uniformly bad. Regaud reviews the lip cases treated with X rays and radium; with the latter Forssell reports cure of 20 early cases out of 34, and Regaud reports satisfactory results, up to the present, in 16 cases out of 22.

Pancoast has had good results in lip cases with radiation alone. As regards prophylactic work he says:—

> "It is our firm belief that every case should have at least a preliminary application of radiation before any attempt at removal of the primary lesion or glands is attempted." He has "practically discontinued giving post-operative radiation unless it is employed as an ante-operative measure as well." "It is a well-recognised fact," he says, "that radiation cannot do well in what surgery has tried to do and failed. The recurrent case after operation does not respond as well as the primary case, because we have to deal with anatomical, physical, and biological factors that are quite different. . . . Cancer tissue once directly traumatised by surgery, without a complete removal, and without previous radiation, does not respond well to any form of treatment."

With our present knowledge this conclusion cannot be applied to all sites of the body, many results, indeed, contradict it; but it may be true of lip cases. In early or moderately advanced cases Pancoast recommends radiation alone, or diathermy and radiation, or a preliminary radiation followed by excision and block dissection and further radiation—a combined X ray and radium technique being frequently used.

The tongue is a most unfavourable site for any form of treatment, but clinical cures by radiation are recorded, especially by methods of radium implantation. With X rays cases often fail to react with massive doses, and do better with repeated fractional doses, given within a period of a month or two at most, as the good radium results of Regaud and others would suggest. Baensch has noted the advisability of some form of fractional dosage in floor of the mouth cases, and my observations tend to confirm this. A few primary upper laryngeal cases have been reported to have done well, also recurrences after laryngo-fissure. Some of my post-operative cases have shown disappearance of grey patches, and clinically slight recurrences.

Treatment of Breast Cancer.

The breast is one of the most difficult areas to treat, both for the surgeon and the radiologist. There are so many factors involved, and each factor is of such importance, that most published statistics leave much to be desired. From the pathological standpoint very dissimilar breast tumours are commonly grouped together for statistical purposes, which Ewing has justly described as a fallacy. From the clinical standpoint cases should be grouped in grades according to extent of invasion (Steinthal's or other group-scheme). For the chance of cure is remote if the supraclavicular glands are once reached; if there are palpable axillary nodes the chance of cure by operation is about 1 to 25 (Ewing), and the general results of operation are clinical cure of 20–40 per cent. Of cases coming to the surgeon already about 25 per cent. are inoperable. The breast, therefore, is one of the fields where radiology may be expected to be of the greatest service in an attempt to reduce the mortality below 70 or 80 per cent. (the percentage of those who would otherwise die of the disease) or in prolonging life beyond the 2½–3½ years' average duration. As elsewhere the radiation results should be considered as prophylactic, palliative, or curative. The best results published so far appear to be those of surgery and radiology combined—for example, those of Anschütz, in a series of 240 cases, with 77 per cent. free of recurrences in 1–3 years, 60 per cent. free at 3 years, and cure of every case of local recurrence. The value of prophylactic radiation in breast cases has been much discussed lately.† But of the widely quoted statistics of Naher, in Perthes' clinic, which started the discussion, it was well said that "no cautious statistician would draw any important inference therefrom."‡ Essential details, such as the patient's age, type of growth, &c., and time and exact method of applying the radiation, are not given. The latter details are vitally important. Blumenthal found that most cases were referred to him for radiation two or three months after the operation, which is much too late. In some cases supra- or infraclavicular glands had already appeared, so that, as he says, it was no longer "prophylaxis." He and several others attribute bad results to faulty method or technique. The chief cause for failure with rodent ulcers has been attributed to wrong technique, and it must be the same with a considerable proportion of failures in breast work. (A remote factor, Strauss notes, is the extraordinary differences in cancer death-rates in different parts of Germany in 1918–19; these varied, approximately, from 21·5 per cent. in

† Medical Science, 1921, 418.
‡ Brit. Med. Jour., 1921, ii., 411.

Frankfort and Munich to 60–69 per cent. in Berlin, Leipzig, and Hamburg.) The method of uniform radiation of a large surface (plane, convex, &c.) was fully discussed so long ago by Holzknecht that it is almost incredible that patients have been observed with lines of recurrences between two limited fields of application (Halberstädter, Blumenthal, and Jüngling have all recorded such clinical observations on cases radiated elsewhere). By a near method, or a distant method like Wintz's, or Holfelder's with one or two tubes at a time, it is possible to give an even surface radiation. Methods can be tested by Kienböck strips or Jüngling's bean method, on patients of different configuration. The pleural dose is another matter, however, as full doses cannot be given at this depth without skin damage (unless in very thin patients). Hence in this region it is necessary to repeat radiation at intervals of 2 to 4 weeks, and again at monthly or longer intervals. By this method a cumulative effect is hoped for on any deeper invasions without producing skin damage. The doses advisable vary, many give too large doses, as Strauss points out; in true "prophylactic" work, after operation on a grade 1 case, only what may be called pre-cancerous or latent cancer cells are left to be dealt with, and these young cells are markedly radio-sensitive. Repeated two-third skin doses should here suffice. It is quite otherwise with advanced grade 2 cases; here in any one of the efferent breast lymphatics left behind after operation, in the supraclavicular triangle, axilla, thoracic wall, anterior mediastinum, or epigastrium, there are probably microscopic channels blocked with mature cancer cells, and in inoperable grade 3 cases this extension is certain in one or more directions. (Pfahler, indeed, finds radiographic evidence of mediastinal or lung involvement in half the cases which come to him.) In these cases one or two massive applications would seem to be preferable if the patient's condition permits of an intensive method. The results of imperfect technique in breast work have been clearly pointed out by Wieser, who gives the pathological findings in a case referred to him by Lorenz. It was a case with a very large inoperable tumour which became so reduced in size a fortnight after radiation that it was removed by Lorenz a month after the treatment. The tumour cells were found to be necrosed with the exception of two deeper layers which had had insufficient radiation. The great importance of avoiding as far as possible plus- and minus-zones of radiation is emphasised by Wieser; the minus-zones do not damage the cancer cells enough, and in them recurrences may take place (as in the strips between limited fields); plus-zones damage the connective tissue, an essential factor in the regression of some types of tumour (in areas badly damaged by excessive radiation recurrences have been seen which no further radiation could affect). Wieser considers that the combination of plus- and minus-zones can very easily lead to distant metastases; it will certainly promote neither the resolution of lines of lymphatic invasion nor the immunity induced by the absorption of radiated and degenerating tumour cells (by "cell-decay hormones," as Freund described them) which is an experimentally well-founded and clinically very probably an important factor in the benefit produced in many cases by radiation. After post-operative radiation Handley says that in his series of cases recurrence in the skin was practically never seen. In three of the five cases in which it occurred the usual prophylactic X ray course had somehow not been given. Out of about 150 breast cases radiated in the past year I have seen very few recurrences while a course of X rays was in progress; a considerable number coming for treatment have shown regression, at least temporarily. About five cases of recurrence in bone have been treated with inconclusive results so far; Holfelder claims to have good results in such cases.

Pre-operative radiation in breast cases is now very largely advocated, especially in America, to prevent local implantations and dissemination during operation (the possibility of this, especially in sarcoma, has long been recognised, and dissemination has taken place in animal tumours as a result of massage of the growth). Sittenfeld reports very good results (not detailed) with 65 cases who had intensive radiation before and after operation.

Curative Radiation of Primary Cases.

For curative radiation of primary cases the best chance is in the early soft medullary type, according to Wetterer and Rieder. Cases of this sort are rare, and rarely seen by the radiologist. Some hold that the end-results with scirrhus are better. Rieder recommends centripetal radiation; the most dangerous part is not the tumour, but the growing edge, which should be attacked first.

On grounds like those of Pancoast with lip cases, that scar tissue and the operative damage to lymphatics make areas operated on unfavourable for radiation, Wintz holds that all operable breast cases should be radiated and not operated on. The results in his radiated cases will be of interest, but the primary mortality is so slight that there is not the same occasion for preferring radiation to operation as Krönig claimed to have in uterine cases, when he abandoned operation in uterine cancer. And certainly large breast tumours, at least, are much better removed by operation or diathermy when possible, so that radiation of the deeper chest wall sufficient to prevent recurrence can be applied with certainty. I have had two operable primary breasts in which the growth practically disappeared, one treated with X rays, the other with radium. In one case operation was refused, in the other the general condition made operation inadvisable. Palliative radiation offers a wide field, sometimes resulting in operability, or else relief from pain, ulceration, &c., or delaying the further extensions, and the almost inevitable issue. I have found in ulcerated cases the best results when zinc or other ionisation has preceded the radiation.

Growths of Mediastinum, Testicle, and Prostate.

In mediastinal growths a few clinical cures have been reported, and a large proportion of cases show temporary benefit. I have had seven cases in the last year. Where the hilum glands are involved care must be taken not to produce too rapid a reaction. One case (Hodgkin's disease) is reported by Czepa; there the patient died a few hours after the radiation owing to local œdema and tracheal pressure. Some form of fractional dosage is therefore advisable, to begin with at least. Testicular tumours are of great interest. I have five cases at present under observation for lumbar gland extension or for recurrence after testicular removal, several responding satisfactorily. Béclère has reported cases from time to time, and lately has collected 11 cases of his own and others in which the abdominal tumour was very radiosensitive; the primary growth in each case was the testicular "carcinoma," a seminoma. Even desperate cases, with cachexia, and very large secondary tumour, or with distant metastases, have recovered. Of the cases reporting for prostatic malignancy at the Mayo Clinic, Bumpus has reported that 28 per cent. already show bony metastasis. This is a much larger percentage than is elsewhere reported, but at the Mayo Clinic every case is thoroughly examined radiographically. Barringer in a series of cases found that in only 2 per cent. was the disease confined to the prostate; in most cases there were already extensions to the vesicles, the bladder, the lateral pelvic walls, or distant metastasis. These findings make the outlook very unfavourable for any form of treatment. Radium implantation methods for prostatic malignancy have been developed in some American centres. At the Mayo Clinic the process is to bury radium first and then enucleate if possible. Cases referred to me have already been far advanced.

Gynæcological Conditions.

In malignant gynæcological conditions there is a wide range of opinion and practice at present as to the value of operation or radiation. At Munich, Erlangen, Freiburg, Heidelberg, and Frankfort, in the gynæcological clinics, no case of uterine cancer has been

operated on for several years. In operable cases the primary and end-results of radiation are considered better than with operation, and a small percentage of inoperable cases can be cured by radiation. 30 to 50 per cent. of all cases are inoperable; a determined effort has to be made to deal with them, and this fact, with a very high primary death-rate after Wertheim operations, led Krönig to initiate the present extensive trial of radiation alone. An analysis by Berger of Krönig's cases of the years 1913–16, when the intensive X ray technique was being developed, shows that even the late radiation results of mixed operable and inoperable cases are slightly better than the operative results. With improved technique the difference may be expected to become more marked. Time has not yet elapsed for the early result of 97 per cent. clinical cure from Erlangen in 24 operable and inoperable cervical cases to be confirmed by five years' observation; over 50 per cent. are said by Seitz to be well two years after the X ray treatment.

There is already a large literature comparing the results with radium as opposed to operation in cervical cancer; at five years Kehrer had 45·4 per cent. recurrence-free with radium, at three years 54 per cent., at five years Döderlein had 80 per cent., and Heymann at Stockholm 60 per cent. Heymann's results with combined radium and X ray treatment (the radium very heavily filtered) gave with 66 cases (94 per cent. inoperable) at five years a cure of 28·8 per cent., which compares very well with the average 25 per cent. of operation cure on selected cases. In cases where radium alone is used the usual technique (except in early cases) must often be considered imperfect; dosage is far from being even throughout, and as Bumm pointed out, intracervical radium cannot affect the pelvic glands or prevent recurrences there. Hence his advocacy of X ray treatment for the whole pelvis, with radium given locally, or X rays after operation. Some facts suggest that combined surgical and radiological technique, as in breast cases, may give better results than either alone. Thus Warnekros has reported, out of 190 cases at Bumm's Clinic, 72 per cent. of cases which had prophylactic radiation recurrence-free after five years, compared with 36 per cent. in those who had no X ray treatment. Similarly, Heimann reports 65 per cent. to 10·6 per cent. These results show the great advantage of a well-planned and well-performed X ray course as a supplement to operation. Radium has frequently been given prophylactically a fortnight or so before operation, and in many such cases little or no sign of malignancy has been found remaining in sections of the area involved. Inoperable cases have frequently been rendered operable after radium treatment. This pre-operative method has not yet, however, been carried out on any large series of cases.

In uterine sarcoma Wintz calculates the X ray results are three times better than the operative—the latter giving about 20 per cent. of cures. Of five inoperable and apparently hopeless X rayed cases, four were at four years well and recurrence-free. He has shown the diagnostic value of X ray treatment in differentiating between myoma and sarcoma, the latter reacting in a few weeks, the former taking months to become smaller. Some cases of primary ovarian malignancy have been reported as having done well, or inoperable peritoneal extension or recurrences. I have had good results in a few such cases. Like testicular growths, ovarian neoplasms are often very radio-sensitive, and pelvic masses may sometimes regress quickly, relieving pressure or other symptoms. A number of cures of vulvar carcinoma have been reported, both by radium and by X rays; with the latter the Erlangen method of radiation from a great distance (to give more equal intensity in the depth) has undoubtedly marked a great technical advance.

Abdominal Conditions.

It is interesting to note that stomach cancer was the first cancer to be treated by X rays (Despeignes, 1896), but it is likely to be one of the last to yield to radiation or to any other form of treatment. Compared with gynæcological cancer, that of the stomach occupies a most unfavourable site, surrounded as it is by vitally important glands and other structures. It is impossible to avoid radiation of the pancreas, and the spleen to some extent, but special care should be taken to avoid the suprarenals—for example, by Holfelder's method of oblique radiation. One case already has been reported of a man, previously vigorous, having died with adrenal insufficiency, after spinal radiation for supposed spondylitis of the lower dorsal vertebræ. Both sides were radiated (cross-fire), and both suprarenals damaged.

After partial gastrectomy radiation is advisable, but very few cases have so far been published. Primary cases with not too marked cachexia should, in my opinion, be given the chance of X ray treatment, as extraordinary results are sometimes witnessed: Werner had two such cases whose cures extended over eight years. Natural recovery is not, of course, impossible, but is improbable in two such cases at the same clinic. Cancer of the colon sometimes reacts well, with or without resection or colostomy. Each case must be treated on its merits, and combined surgery and radiation are usually indicated. A few clinical cures are reported with X rays or radium, or the two combined, in rectal carcinoma. Schmieden has here worked out a combined surgical and radiological technique which he says is giving very good results.

Sarcomata.

There is a considerable literature dealing with sarcomata, apart from uterine sarcoma. Perthes and Jüngling have summarised conclusions which may at present be accepted, based as they are on treatment of 47 cases. (1) In all cases of inoperable sarcoma, X rays should be tried, even in large glio-sarcomata of the brain. The remarkable results in hypophyseal tumours are noteworthy. (2) Lympho-sarcomata should be radiated rather than operated on, as they react perfectly well to radiation. (All of 17 Erlangen cases, all of 16 Tübingen cases did well; Werner has clinical cures lasting over five years.) (3) Periosteal sarcomata of pelvis, shoulder, or limb joints give better results with radiation than with operation. (4) Myelogenous sarcoma sometimes regresses without any treatment, and the results of resection are good, but if amputation is considered radiation should first be tried. (5) Maxillary sarcomata, if operable, should be resected; they are difficult to radiate satisfactorily, and all the early recorded cases were under-dosed. (6) Skin sarcomata should first be radiated—if refractory, as some melanotic ones are, they should be excised. Jüngling does not confirm Seitz and Wintz's observation that sarcomata which have been operated on or have recurred react worse than non-operated cases. He confirms what Kienböck noted, that local recurrences are rare after a radiation cure. The two difficulties with sarcomata are, first, that a certain number (20 per cent.) of all surgical sarcomata are refractory to 70 per cent. radiation doses; there is, therefore, no "sarcoma dose." Holfelder advises considerably larger radiation doses in surgical sarcoma than suffice for gynæcological. The second difficulty is general metastasis, but many of the distant sarcomatous metastases are responsive, even when very large. Jüngling points out that cachexia with sarcoma has not the bad significance of cachexia with carcinoma.

Local Results of Radiation.

The results of radiation on a tumour which reacts well may be three: (1) Complete disappearance, by absorption of the degenerated tumour cells; or (2) lessening in size of the tumour, but persistence of a residue, usually firm proliferative connective tissue (it may be advisable in some cases, if possible, to remove this by operation, but if not it should be watched for many years for signs of renewed activity); (3) reduction to a certain degree (as Blumenthal has shown) and then no further change, the tumour appearing biologically dead. Rapid increase in size and generalisation are sometimes observed in cases under-dosed, or refractory, or already too widespread;

and as septic malignant tumours (of the neck, &c.) sometimes slough rapidly after heavy radiation, fractional dosage methods are here advisable if the case seems at all suitable for treatment.

Local results, apart from those in the tumour, are usually temporary, such as those in the skin, salivary and intestinal glands. Burns and fistulæ as results are but the "children's diseases" of radiation therapy, as Döderlein says. Skin and lung induration as a possible result of heavy dosage have to be considered; they usually pass in the course of a few months. The possibility of local œdema should be considered beforehand, especially in laryngeal and mediastinal cases; it has not so far been reported in brain cases. The majority of cases of serious damage already reported have been in the larynx or trachea, and in the bowel (ileum, cæcum, and sigmoid). From some of the large doses published from some quarters it would seem that unjustifiable risks are being taken by a few workers, though the risks in advanced cases do not in any way approach the operative risk. In rectal cases, for example, there is often a large septic element; hence widespread necrosis may be seen after any interference, whether operative or by radiation. However, in the majority of cases of bowel damage reported, technical errors cannot be excluded or were evident, the doses being too frequently repeated, or there was over-dosage, this being probable particularly in some of the cases where combined radium and X ray treatment was given. If there was no technical fault, then there were bowel adhesions or a site of lessened resistance due to previous operation or disease. In all the cases of bowel damage (with one death) reported by Fried operation had been performed previously, showing the great care necessary to avoid over-dosage in post-operative prophylactic abdominal work.

General Results.

Undesirable general results from radiation are usually seen in the blood or intestinal or ductless glands. In a considerable series I have not found as much blood-change as I had been led to expect, nor have I had trouble with bowel sequelæ; in one stomach case there was slight but definite adrenal insufficiency for about two months, in spite of only one adrenal having a considerable dose. I have no doubt that advanced patients treated by radiation alone do not respond locally or generally as well as those to whom some supplemental treatment is also given. Werner was one of the first to show the value of arsenic and other preparations as adjuvant to radiation, and Blumenthal has emphasised the value of combined treatment, radiation plus arsenic or iodine, &c. Colloidal copper and lead, protein, and a multitude of other injections have their advocates. Rubens-Duval has an elaborate scheme for increasing the defence of the patient against cancer, by combined opotherapy, remineralisation, sulphur administration, and vaccine-therapy. The last is certainly useful in dealing with combined malignancy and sepsis. Fraenkel has written much about the probable rôle of the endocrine glands in malignancy, advocating stimulation doses to the thymus, spleen, &c. I have tried some cases this way, especially when there has been a superadded infection of a malignant tissue, with results so far inconclusive. Fraenkel's views are interesting, but so far unsupported by clinical facts, as Halberstädter and others have pointed out, or by definite pathological facts, as Karlefors' inconclusive pituitary and thyroid results show. There is no question, however, as to the value of spleen-stimulation doses in improving the blood-picture. At Erlangen this is now regularly done in anæmic cases.

Temporary general effects of radiation such as Rontgen sickness are reduced in intensity by careful previous preparation of the patient, by smelling—e.g., eau-de-Cologne during the séance, by technical methods such as that I described at the B.M.A. meeting last July, whereby the time for the radiation séance may be shortened in certain cases or areas by using wax or other superficial covering, so as to give in a shorter time an equal depth-dose to that given by radiation from a distance of 70–100 cm., or finally, as Wintz has suggested, by earthing the patient when this can be done safely, as the high induced voltage of the patient's body while the treatment is being given is a potent cause of nausea and disturbance.

Present Conclusions.

From the combined surgical and radiological point of view Schmieden has recently published a most valuable paper on the indications for surgical and X ray treatment of malignant tumours. Perthes' detailed views on sarcomata have already been given. Schmieden and his X ray assistant Holfelder have summarised conclusions which represent what may be called cautious progressive present-day opinion: 1. With few exceptions every operable carcinoma should be operated on, with prophylactic post-operative radiation in addition. 2. In addition to post-operative radiation, a single intensive radiation before operation is coming to be considered important. 3. Practically all inoperable carcinomata and all inoperable recurrences should be radiated. This gives in many cases clinical cure, in others it results in operability, often less bleeding, irritation, and pain, as well as limitation of further metastasis. 4. Facial carcinomata, even when operable, can well be treated exclusively by radiation for cosmetic reasons. 5. Sarcomata, as a rule, should only be radiated, certainly in all cases in which operation would cause considerable bodily mutilation. (Any increase in size of the tumour after an efficient radiation should not be considered proof of failure to respond, it is usually only temporary.) Schmieden here gives five essential technical requirements. 11. In the treatment of malignant tumours, along the whole line, X ray work has become superior to radium treatment.§ 12. The time has not yet come when comparative statistics can show the value of operation or radiation.

Werner in a useful summary says that as yet ray therapy only in a proportion of malignant tumours can be compared with surgery in its results. But in carcinoma of the skin, lip, inner cheek, soft palate, upper larynx, thyroid, vulva, vagina, uterus, tumours of the hypophysis and mediastinum, and sarcomata, which often react promptly, radiation may be preferred. All operable new growths not in this series are better operated on than radiated, if one or other procedure must be chosen.

Lines of Advance in Treatment.

Radiation treatment is in rapid process of evolution and there are at least six possible lines of advance: 1. In the engineering and electrical workshop, improvement of apparatus in power and reliability. 2. In the physical laboratory much remains to be done with measurements of dosage, standardisation, calculation of scattered radiation and absorption in animal tissues (this is specially necessary for radium dosage, as Guilleminot and others have noted); the physical side of biological radiation effects—for example, ionisation and osmotic changes in cells and fluids—requires much research. 3. In the post-mortem room and the pathological laboratory, more statistical and experimental work; apart from immunity and gross animal tumour work, the histological tissue reactions to radiation, as Ewing says, seem to require the combined genius of a Waldeyer, a Weigert, and a Virchow to elucidate them; here new methods like vital staining may be of use; and there is a very wide range for biochemical investigation as to the radiation effects on basal metabolism, &c., as to the rôle of the cell-lipoids and cell-decay products, &c. 4. Clinical technique is a most important branch requiring much further working out—for example, anatomical technique of radiation applications to different sites of the body on such lines as Holfelder's in Schmieden's clinic by sectional scaled sheets and models and graphical representation of radiation fields. For the last year I have used scaled drawings in almost every case, and regard this as essential. Auxiliary technique

§ (This leaves out of account the improved results attained with the new (American) radium technique—burying of numerous small tubes, and massive surface radiation from a distance.)

such as diathermy, ionisation, radiation stimulation (ductless gland) dosage, or general minimal repeated radiation or other means for stimulating the patients' immunity requires much further research. 5. In relation to surgery enough has already been said as to the necessity and value of team-work, and the best results have been shown so far in several important spheres to have been the result of close coöperation between surgeon and radiologist. Much still has to be learned as to the value of pre- or post-operative radiation, or both, and when the raying should be given in relation to the operation, and in what types and sites of lesion one or other or a combined method is best for the patient. 6. Finally, auxiliary medical measures require much further investigation; though about 100 substances have already been tried, still in this sphere, some day, may be discovered what may displace both surgery and radiation in the treatment of malignant disease. At present the general management of the cancer patient is too often neglected; open air, exercise, diet are not unimportant in recovery, and the rôle of hæmatinics, colloid, protein, and animal extract injections or transfusion, and of drugs such as arsenic, iodide, &c., is little understood yet.

From the clinical as from the pathological standpoint there is no doubt, as Ewing has said, that "radiation therapy has introduced a new era in the study of cancer." He has emphasised the experimental evidence recently accumulated as to the artificial immunity against cancer produced by the absorption in the body of radiated tumour tissue. Whatever the ultimate value of radiation treatment may be, alone or as a combined method, from the point of view of immunity, and from the fact that in its mode of action radiation "calls on nature's forces to accomplish the cure," we must hold with Ewing that "the curative action of Rontgen ray and radium . . . . is the first rational therapy of cancer ever devised."

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CHRONIC FÆCAL TYPHOID CARRIER SUCCESSFULLY TREATED WITH DETOXICATED VACCINE.

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CHRONIC typhoid carriers have hitherto proved so resistant to treatment that the following notes of a case treated with detoxicated vaccine with apparent success seem worthy of record.

The carrier, Mrs. X, passed through an attack of typhoid in 1903 while resident in South Africa, and after coming home was associated with five outbreaks of typhoid at the farm occupied by her husband, with a total of eight cases, six of whom were servants, three male and three female, while the other two cases were neighbours who obtained milk from the farm. The cases occurred in the following years: 1904, 2 cases, domestic servant and neighbour getting milk; 1906, 1 case, farm servant; 1907, 1 case, farm servant; 1910, 3 cases, farm servant, domestic servant, neighbour getting milk; 1917, 1 case, domestic servant. In 1909, Mrs. X's husband had a severe illness, which was diagnosed as influenza. He was confined to bed for three weeks, and after getting up had a relapse which confined him to bed for three weeks more. Insomnia was a marked feature of the illness, and it might possibly have been typhoid.

I found Mrs. X to be a fæcal typhoid carrier in 1910 in connexion with the outbreak in that year. Every precaution was taken to prevent further outbreaks, but in spite of these a case occurred in 1917—a domestic servant, aged 18. Early in 1921, I arranged—with the kind coöperation of Dr. David Thomson, director of the Pickett-Thomson Research Laboratory, St. Paul's Hospital, London, who undertook to supply a detoxicated autogenous vaccine—to try a course of vaccine treatment for this case. Some time was lost at first, as Mrs. X developed an attack of diphtheria. As soon as she had recovered, samples of her stools and urine were examined to determine whether she was still a carrier. Examinations were made on April 5th and 15th, May 6th and 24th, June 30th and July 21st.

Treatment.—The sixth sample of stools, examined on July 21st, proved positive, the others having been negative, and after some further delay treatment was commenced in the beginning of December, the dosage in thousand millions being as follows: 1, 2, 4, 6, 8, 10, 12, thereafter rising by additions of 1000 millions each time to 30,000 millions. The vaccine was given by subcutaneous injections at intervals of five days, and the following is a note of the reactions observed.

For the first three injections there were no local reactions, but after that there was always some local reaction in the nature of an inflammatory area round the site of inoculation. This, however, did not increase in proportion to the increase of dose. Sometimes it was more pronounced, and the next time not so much.

(*Continued from previous column.*)

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Wieser, W.: Einfluss der Plus- und Minus-zonen in der Intensitätsverteilung der Roentgenstrahlen auf die klinische Ausheilung des Karzinoms, Wien. med. Woch., 1921, 39 and 40, 41, 1731, 1762.

It lasted about two days, and then gradually disappeared. The arms were injected alternately, the upper arm being the site of inoculation. There was no constitutional reaction of any kind until the last few doses, when general symptoms of headache, sleeplessness, and very severe backache appeared, while the local reaction got so severe that the arm had scarcely returned to its normal condition when the ten days were up. The treatment was accordingly discontinued for a time.

A sample of stools was examined in the end of March and found to be positive. Another sample taken on June 9th, just after the treatment was stopped, resulted in the finding of an organism giving all the cultural reactions of *B. typhosus*, but not agglutinating with serum. A second sample taken on the 16th and a third on July 15th both gave the same organism. Treatment by subcutaneous injection was resumed in the beginning of September, the same course being repeated, beginning with 1000 millions. At the same time, at Dr. Thomson's suggestion, a course of vaccine by oral administration was commenced, and along with the vaccine were given pills of ox-bile, 2 gr. in each. The vaccine was standardised to a strength of 100,000 millions per c.cm. The dosage for oral administration began with 5 minims per day, and was gradually increased to 2 drachms. The second course of subcutaneous injections was continued from the beginning of September till the middle of November, the dosage reaching 23,000 millions. Subcutaneous injections were then stopped, but oral administration of vaccine was continued.

A sample of stools was examined on Sept. 7th and proved negative. The non-agglutinating bacillus was not found in it. Since then 17 samples have been examined: 2 in September, 4 each in October, November, and December, and 3 in January of this year, and all have been negative. The examination of samples is being steadily continued, in case the absence of typhoid bacilli in the stools is due to an intermittent period, such apparently as she had from April to July, 1921.

Bacteriological Report.

Dr. J. W. Tocher reported on the examination of the stools. The first report (test of March 21st, 1922) gave the typical typhoid bacillus; the subsequent reports (tests of June 9th and 29th, and July 21st) gave as a positive result an atypical bacillus giving all the cultural reactions of *B. typhosus*, but not agglutinating with serum. These three were returned as positive. Eighteen other tests, all negative, were made between Sept. 6th, 1922, and Jan. 26th, 1923. The bacillus isolated in the three tests immediately following the first test was a Gram-negative rod, feebly motile and giving all the sugar reactions of *B. typhosus*. It was, however, non-agglutinable by any of the stock serums in the laboratory. Emulsions of this culture, injected intravenously into a rabbit, failed to produce agglutinins towards this organism. The growth in broth was inclined to form filaments.

An examination of the organism found in the June and July samples was made in another laboratory to which Dr. Thomson sent a sub-culture, and the report made confirms Dr. Tocher's results. The report is as follows:—

"I do not think it is a typical typhoid bacillus (although I agree it gives all the typhoid sugar reactions, &c.). It is very feebly motile, and has a tendency to become filamentous in broth. We plated it again and it appears pure. Now a guinea-pig has been inoculated with it to obtain immune serum to try against all the typhoid-enteritidis group from the Standards Laboratory, Oxford."

A further report says:—

"An emulsion of that bacillus is not agglutinated by any of the Standards sera typhosus, para. A and B, Gaertner and Aertrycke, and so far is not agglutinated by inoculated animal serum. Inoculation with 2 c.cm. of a 24 hours' old broth culture failed to kill a guinea-pig, so that the organism is evidently non-virulent."

Perhaps the most interesting feature in the case recorded is the bacteriological findings in that typical typhoid bacilli were first isolated, and later the organism became atypical, giving the sugar reactions but failing to agglutinate. Neither *B. typhosus* nor the atypical bacillus has been recovered from the stools after 18 successive examinations.

ENCEPHALITIS LETHARGICA:

AN INTENSIVE OUTBREAK IN A SMALL SCHOOL.

BY L. L. FYFE, M.B., CH.B. GLASG., D.P.H. CAMB.,
ASSISTANT COUNTY MEDICAL OFFICER OF HEALTH, WARWICKSHIRE.

ON Oct. 20th, 1922, the head teacher of the council school at Radway, a remote village situated near Edge Hill in the extreme south of Warwickshire, reported to the county medical officer of health (Dr. A. Hamilton Wood) that some of the children in her school were presenting unusual symptoms, in that they were continually dropping off to sleep whilst in school. On the 23rd, acting on the instructions of the county medical officer of health, who in the meantime had made some preliminary inquiries, I investigated the cases and found that four children in all were affected.

CASE 1.—A girl, aged 13. During the afternoon of Sept. 15th, she fell asleep in school and was only roused with the greatest difficulty. The head teacher stated that she had to walk her up and down the playground before she could be sufficiently roused to go home by herself. She remained away from school over the week-end, returning to school on the 19th. Since that time she had attended school daily, but had been continually drowsy, and complained of frontal headache. She fell asleep every day in school and awoke spontaneously after sleeping about an hour and a half. No squint was noticed, but the head teacher observed that the child's writing was not up to her usual standard, the characters showing a shakiness. On Oct. 17th (more than a month after the onset of her illness) she complained of diplopia and has suffered from this at intervals ever since.

Condition on Examination.—On visiting the school, on Oct. 23rd, I found the child asleep at her desk. There was, however, no difficulty in rousing her. When aroused she was quite intelligent and gave a good account of her illness. She was rather pale, had slight attacks of shivering, and complained of slight vertigo. There was an internal strabismus of the right eye—probably a permanent condition, as she wears glasses to correct an error of refraction. She stated that *since* her illness she had double vision unless she wore her glasses; she was quite certain that she had no diplopia prior to her present illness, whether she wore her glasses or not. There was some paresis of the right leg and she dragged the right foot in walking. Temperature and pulse normal. She had been in Radway until the end of the first week in August, when she went on holiday to Sparkbrook in Birmingham, where she remained until the end of the second week in August. During the last fortnight in August and the first week in September she stayed with friends in Walsall Wood (near Birmingham). She returned to Radway on Sept. 7th, and went to school on the following day.

CASE 2.—A girl, aged 14. On the morning of Oct. 9th this child felt sick and vomited once. Since then she had suffered from severe frontal headache and marked drowsiness, having fallen asleep at intervals during the day. On the 20th she complained of dimness of vision on waking in the morning. This, however, passed off and had not since returned. She had had no diplopia. The teacher stated that she noticed that the child's writing was not so good as usual.

Condition on Examination.—On Oct. 23rd the patient was found asleep at her desk. She was easily roused and answered questions intelligently. She complained of slight sore-throat, but the fauces appeared normal on examination. There was, however, slight adenitis of the submaxillary glands. She had slight shivering attacks during the examination and tended to drop asleep. She stated that she had slight giddiness on attempting to walk immediately after waking, but that this soon passed off. There was no squint or diplopia and no apparent paresis of any limbs. Temperature and pulse normal.

CASE 3.—A girl, aged 11, who had been ill since Oct. 11th, complaining of severe frontal headache and drowsiness. She vomited on the first day of her illness, but not since; had been drowsy since the onset, continually dropping off to sleep in school. The teacher stated that not before the 23rd had she had any difficulty in rousing her. Headache was a marked feature in this case; it was not continuous, but she had had severe paroxysms lasting two or three hours every day. Since the commencement of her illness she had had dimness of vision in her right eye, but no squint or diplopia. The teacher stated that she had great difficulty in rousing her on the morning of my visit, and that when she eventually succeeded in doing so the child was quite delirious. She apparently did not recognise the teacher and started hitting out in all directions. When I saw her the

delirium had passed off, but she was still confused mentally. She complained of severe headache and dimness of vision in the right eye. There was no squint or diplopia. Temperature 100° F., pulse 110. When attempting to walk she staggered about as if under the influence of alcohol, there being obvious weakness and incoördination of the lower limbs.

CASE 4.—A girl, aged 9. The first sign of illness was on Oct. 13th, when she dropped off to sleep in school and slept for half an hour. She was roused and sent home in charge of an elder brother. She dropped down and fell asleep on the roadside on the way home. On reaching home she slept all the afternoon. She returned to school on the 16th, and then appeared better on the whole, but rather drowsy. On the morning of the 18th she fell asleep in school again and was sent home. Her parents, however, sent her back to school in the afternoon, when she again fell asleep. On the 20th she slept most of the morning in school, and on being roused at midday fell asleep in the act of drinking a cup of cocoa. When seen by me she was asleep at her desk; she was roused comparatively easily and made no complaint of anything beyond "sleepiness." There was no headache. She had previously lost an eye through an accident, so no diplopia was possible; there was slight conjunctivitis of the remaining eye and a slight "puffiness" round the orbit, but no squint. There were also definite choreiform movements of the head and the left side of the face. On being asked to walk she presented eversion and dragging of the left foot. Temperature 99·4° F., pulse 100.

In view of the above symptoms I formed the opinion that all four cases were suffering from mild but definite attacks of encephalitis lethargica, and gave instructions that they should be excluded from school. On Nov. 2nd, accompanied by Dr. A. C. Parsons, medical officer of the Ministry of Health, I again visited the cases and found them in the following condition:—

CASE 1.—General condition much improved. Had had no further attacks of somnolence, but suffered occasionally from headache. She stated that she still had diplopia when not wearing her glasses. There was still slight paresis of right leg.

CASE 2.—Had had no further attacks of somnolence. The child stated that she had an occasional slight headache, but was otherwise quite well.

CASE 3.—General condition much improved. There had been no further attacks of somnolence; vision had been normal. Still had occasional headaches, but were not so severe and did not last so long. She was quite steady on her legs, there being no signs of the weakness and incoördination noticed on Oct. 23rd.

CASE 4.—Had had no further attacks of somnolence. There was still some paresis of the left leg. Choreiform movements of the face and head still present, but not so marked.

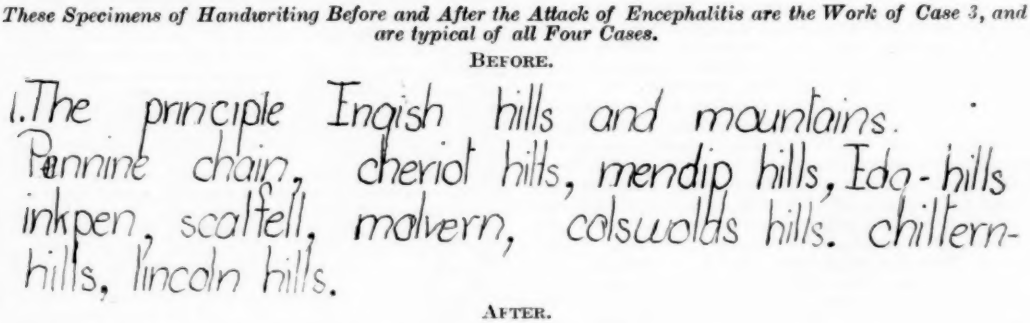
All four cases were again seen by me on Nov. 9th, 1922, and the following notes were made on their condition:—

CASE 1.—Now appears to have completely recovered, but states that she still has diplopia when not wearing her glasses.

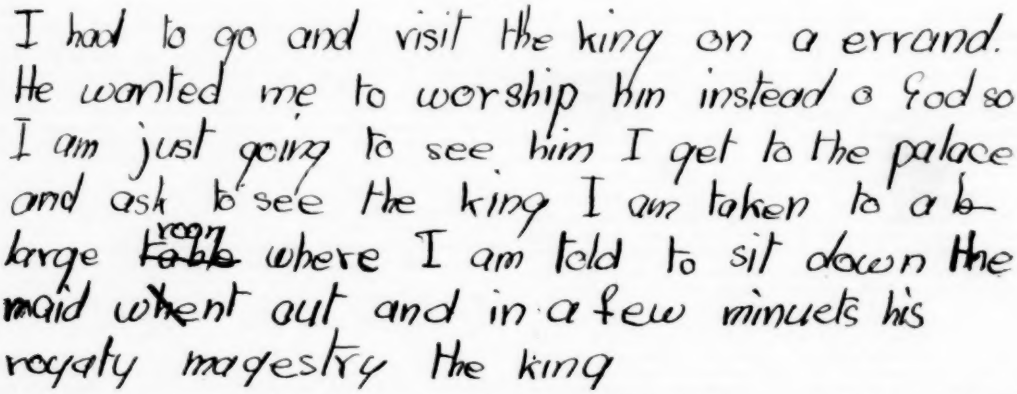
CASE 2.—Appears to be in good general health. Has had no drowsiness, but states that she still has occasional headaches.

These Specimens of Handwriting Before and After the Attack of Encephalitis are the Work of Case 3, and are typical of all Four Cases.

BEFORE.


1. The principle Ingish hills and mountains.
Pannine chain, cheriot hills, mendip hills, Ida-hills
inkpen, scaltell, malvern, colswolds hills. chiltern-
hills, lincoln hills.

AFTER.


I had to go and visit the king on a errand.
He wanted me to worship him instead a God so
I am just going to see him I get to the palace
and ask to see the king I am taken to a b-
large room where I am told to sit down the
maid whent out and in a few minuets his
royalty magestry the king

CASE 3.—This girl has now completely recovered and has no symptoms of any kind.

CASE 4.—Choreiform movements of the face and head are much better. Paresis of leg has completely disappeared.

On Dec. 6th all four cases were seen again, and as they appeared to have completely recovered, permission was given for them to return to school. On the 12th the head teacher wrote to me stating that she was not satisfied with the condition of the children and requested that I should see them again. On arrival at the school the head teacher informed me that Cases 1, 2, and 3 had all, on returning to school, shown symptoms of hysteria. (The fourth case had been sent away for a holiday, and was reported to have made a complete recovery.) They were unduly emotional, and all had had fits of crying and laughing; they also complained that their colour-sense was defective. The head teacher had noticed that their school work was far below their usual standard. (A specimen of work is given herewith.) She considered that they were all anxious to do their best, but that they were unable to concentrate their attention for any time, and that they very soon showed signs of mental fatigue.

When seen by me all three children were in excellent physical condition, and on my arrival at the school they were taking an active part in the games in the playground. On examination they all three presented

one marked symptom—viz., a very definite defectiveness of memory for recent events. None of them could give an accurate account of the lessons in which they had been engaged in the earlier part of the day. As a control, three normal children, picked at random, were asked the same set of questions and the difference between their answers and those of the three patients was most striking. Their colour-sense and visual acuity appeared to be quite normal.

On Feb. 6th, 1923, all four cases were seen again :—

CASE 1.—The head teacher reported that for the last fortnight she has noticed a trembling of this girl's legs; she stated that the girl still has frequent attacks of hysterical laughing and crying, and that her school work, although showing slight improvement, is still considerably below normal.

On examination a marked tremor of both lower limbs was found—the condition being so marked that when the child sits on a chair there is a continual tapping on the floor with her feet, which she is quite unable to stop unless she puts her weight on to the limbs. The limbs are slightly spastic and there is no loss of power. The child says she can walk quite easily and appears to do so. Both knee-jerks and the tendo Achillis jerks are considerably exaggerated.

CASE 2.—This child was reported to have had tremor of the right leg for the last fortnight. She has also had hysterical outbursts, and her school work is still below her usual standard. On examination there was a gross tremor of the right leg, the right arm, and a fine tremor of the right side of the face, the latter being most marked round the orbit. The child was quite unable to keep her leg or arm steady. Knee, tendo Achillis, and triceps jerks all greatly exaggerated, the slightest tap causing the limb to "fly out." She states that the tremor continues all day, getting worse towards evening, or when she is tired, and that after she has walked for some time she is conscious of loss of power in the leg.

CASE 3.—This case continues to improve. Her school work is hardly back to her usual standard, but the head teacher considers that she is making steady progress.

CASE 4.—This child appears to have made a complete recovery.

Remarks.

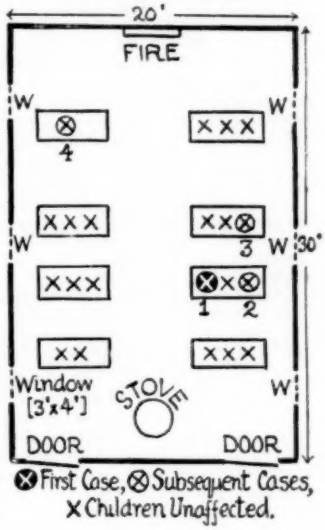
This small epidemic of encephalitis lethargica appears to present several features of interest. It seems reasonable to presume that Case 1 caught the infection some time during the first three weeks in August, and the first week in September. She was apparently incubating the disease when she returned to school on Sept. 8th. This suggests an incubation period of at least nine days, as it is highly improbable that she contracted the disease in the remote village of Radway, which is situated four miles from the nearest railway station, the nearest towns of any size being Warwick and Stratford-on-Avon, 15 and 12 miles away respectively. Her three school companions, none of whom had been out of the village for some months previously, with the exception of a single visit to Stratford-on-Avon by Cases 2 and 3, fell ill on Oct. 9th, 11th, and 13th respectively, roughly a month after they were first exposed to infection. One cannot, of course, draw any conclusion respecting the incubation period on this account, as Cases 2, 3, and 4 were presumably daily exposed to infection from Sept. 15th onwards. It is interesting to note that in the school in question there was no overcrowding and that the hygienic conditions are exceptionally good, particularly with regard to lighting and ventilation.

The room in which the cases occurred has adequate cross ventilation from six windows, supplemented by an open fireplace and an iron stove with flue.

The measurements of the room were as follows: Area of room, 20 by 30 ft. (600 sq. ft.); cubic space, 7200 cub. ft.; room occupied by 11 girls and 10 boys, and 1 teacher, total 22 persons; cubic space per child, 327 cub. ft. (more than three times the amount required by the Board of Education).

Another point of interest with regard to this outbreak is that there was apparently a definite infection from the first case to the subsequent ones. According to the Report on Encephalitis Lethargica (1922, No. XI.), published by the Ministry of Health, in only one instance previously—viz., an outbreak in an institution in Derby—has such a definite case-relationship been established. Points of minor interest are the mild and ambulatory type of all four cases, and in spite of the mildness of type, the persistence of symptoms for a comparatively long time. In three of the cases there remains at least three months from the onset a distinct intellectual weakness, and in two apparently a definite lesion of the nervous system.

Rough Plan of Schoolroom showing Distribution of Affected Children.



In conclusion, I would like to express my indebtedness to Miss Turner, the head teacher, for the remarkably accurate histories of the cases with which she supplied me, and to Dr. Hamilton Wood for his permission to publish this article.

Note by Dr. A. HAMILTON WOOD.

As is shown in Dr. Fyfe's report of this interesting outbreak, the recorded cases, while being undoubted cases of encephalitis lethargica, were all mild in character, but fortunately not so mild as to escape detection. The symptoms of lethargy and somnolence might in some instances be so indefinite as to make the recognition of the true nature of the disease extremely difficult. Notwithstanding the mild character of the disease in this particular outbreak, sleepiness being the chief early characteristic shown in each case, late sequelæ appeared after the children had apparently recovered. This account should be of considerable interest and significance to school medical officers, owing to the possibility of the discovery of obscure nervous manifestations, mental as well as physical, in children whose histories provide little or no indication of a cause for such disturbances. The report also demonstrates the need for careful and continued observation of all children associated with such an outbreak with a view to discovering possible missed cases, although I am not prepared to say how far this is of importance from a public health point of view, since the duration of infectivity in encephalitis lethargica has not yet been definitely indicated. Dr. Fyfe's investigation of this outbreak was made not only in close collaboration with the Ministry of Health, but much useful information which assisted him materially in the conduct of his inquiry was gained from Dr. A. C. Parsons's "Ministry of Health Report on Encephalitis Lethargica, 1922, No. XI.," which was fortunately published only a few weeks before this epidemic occurred.

WEST RIDING ASSOCIATION OF GRADUATES OF EDINBURGH UNIVERSITY.—The Yorkshire Association of Graduates of the University of Edinburgh met at the Midland Hotel, Bradford, on Jan. 24th. It was decided that the society be known in future as the "West Riding Association." An enjoyable dinner followed at which 60 members and guests were present. The President, Dr. Rabagliati, proposed the toast of the University. Prof. Lorrain Smith, the guest of the evening, in an excellent reply, traced recent developments and changes in the University, referring especially to its connexion with Paris, and to the recent lamented loss of several of its distinguished teachers. He congratulated the society on its successful resuscitation, and took back the best wishes of the graduates to their alma mater.

Clinical and Laboratory Notes.

TWO CASES OF ACUTE LYMPHATIC LEUKÆMIA.

BY W. E. COOKE, M.D. LIVERP., F.R.C.P. EDIN., D.P.H.,

HONORARY PATHOLOGIST AND BACTERIOLOGIST, ROYAL ALBERT EDWARD INFIRMARY, WIGAN.

THE following cases have several points of interest.

CASE 1.—A female, aged 3 years, was healthy until three weeks before admission to hospital, when her parents noticed that she was paler than usual. She was admitted on Dec. 30th, 1921, and died the same night with symptoms of cardiac failure.

Post-mortem.—Cadaver pale; purpuric spots on legs and chest; no superficial glandular enlargement; purpuric spots on pericardium and pleuræ. Heart pale and flabby; thymus normal. No enlargement of mediastinal glands; mesenteric glands markedly enlarged; spleen slightly enlarged; liver and kidneys large and pale. Bone marrow of femur pink in colour.

Blood Film.—A film was taken on admission and showed lymphocytes 89 per cent., myelocytes 5 per cent., polymorphonuclears 3 per cent., transitionals 1 per cent., large mononuclears 2 per cent. The small lymphocytes predominated, being 76 per cent. to 24 per cent. of the large variety. Anisocytosis was marked and normoblasts and megaloblasts were frequent.

Histology.—Sections showed the usual lymphatic infiltration in all the organs, the bone marrow of the femur appeared devoid of fat and consisted chiefly of lymphocytes and red corpuscles.

CASE 2.—Male, aged 2½ years. A month before admission the cervical lymph glands were noticed to be enlarged. Admitted with acute angina on August 1st, 1922, and died the same night.

Post-mortem.—All lymphatic tissues enlarged; superficial glands of neck, axillæ, and groins, tonsils, thymus, mediastinal and mesenteric glands very much enlarged; Peyer's patches prominent. Liver and kidneys enlarged and pale; spleen very little enlarged; purpuric spots on pericardium.

Blood Film.—Shows lymphocytes 99 per cent., of which the small variety constituted 82 per cent. and the large variety 18 per cent.

Sections.—All the organs show lymphocytic infiltration.

The points of interest in these two cases are first, the ages, 3 and 2½ years; second, one is a female; and third, in one case the lymphatic tissue enlargement was confined entirely to the abdominal glands, while in the other all the lymph glands in the body were involved.

THE USE OF RHUBARB IN ACUTE BACILLARY DYSENTERY.

BY H. C. BROWN, C.I.E., M.B., B.CH. CAMB., MAJOR, I.M.S. (RETD.)

(From the Wellcome Bureau of Scientific Research.)

Burkitt, writing from Nairobi,[1] in referring to the treatment of bacillary dysentery with rhubarb, says that he knows of no remedy in medicine which has such a magical effect. The following investigation was undertaken with a view to ascertain the way in which the rhubarb acted in this disease, and which constituent was responsible for this action.

In the first place, a solution containing all the purgative constituents of rhubarb soluble in water was used, 1 g. of rhubarb extract (B.P.) was contained in 3 c.cm. of this solution. For a full account of the constituents of rhubarb the paper by Tutin and Clewer[2] should be consulted. Five c.cm. quantities of the above solution were taken and each was planted with 0·2 c.cm. of a filtered 24 hours' broth culture of the following organisms: *B. dysenteriæ* Shiga, *B. dysenteriæ* Flexner, and the bacillus No. 1 of Morgan, the solution was allowed to act upon the organisms at room temperature for varying time limits up to two hours, and then a 3 mm. platinum loopful was taken and planted into 10 c.cm. of nutrient broth. In each case, after 48 hours' incubation, there was growth in the broth tubes, proved by serological or cultural tests to be the growth of the organism used.

In the second instance, another sample of rhubarb extract of the same strength was employed, but in this case the extract had been neutralised to litmus and then 1 c.cm. of N/10 NaOH added to 100 c.cm. to make it slightly alkaline. The test was repeated as in the former case with the same result—i.e., this extract had apparently no action upon the dysentery bacilli in two hours. A third extract also was used in which 6·7 g. of the portion of rhubarb extract insoluble in water was dissolved in a total of 67 c.cm. of water with the aid of 6·6 c.cm. of normal soda solution, the result in this case was the same as when using the extracts made from the soluble portions of rhubarb.

It was then suggested by Dr. Andrew Balfour that the therapeutic action which is claimed for rhubarb, in cases of bacillary dysentery, might be due to its cholagogue action, and in order to investigate whether this was so, a 10 per cent. solution of taurocholate of soda was allowed to act upon a filtered broth culture of *B. dysenteriæ* Shiga and Flexner, as in the above experiments, and subsequently in its place undiluted ox bile was used, but in both cases cultures taken after two hours' interaction at room temperature showed growth of both varieties of dysentery bacilli. The sterile ox bile was obtained fresh from the slaughter-house and was unheated. Knorr[3] has shown that, although prolonged action of ox bile on the Shiga-Kruse bacillus has a damaging effect, yet, under certain conditions, an actual increase of this organism takes place when acted upon by ox bile, and that in the case of the Y strain a definite enrichment occurs; the time limits of interaction used by this observer vary up to 72 hours.

From the above it does not seem to be proved that the therapeutic effect of rhubarb in bacillary dysentery is due to its cholagogue action. The next point investigated was the possibility of the serum of an animal which had been dosed with rhubarb being germicidal to dysentery bacilli. A rabbit was given hypodermically three doses on successive days of 2 c.cm. of equal quantities of the soluble and insoluble extracts of rhubarb, and the serum from this rabbit, and also from a normal rabbit, was allowed to interact at room temperature, at varying time limits up to one hour, with a filtered broth culture of dysentery bacilli. The proportions of sera and culture were the same as used in the above experiments; subcultures showed no difference in growth between the tubes containing serum of the normal and treated rabbit—the growth in each case was tested serologically.

For purposes of contrast and control cultures of *B. dysenteriæ* Shiga and *B. dysenteriæ* Flexner were submitted to the action of the intestinal disinfectant dimol. Five c.cm. of the dimol lavage solution was taken and to it was added 0·2 c.cm. of a filtered broth culture of the above organisms; cultures were taken at varying time limits from 2½ minutes, and all these cultures remained sterile. This lavage solution, therefore, of which one quart is administered, is capable of killing dysentery bacilli in 2½ minutes.

From the above it appears that neither extracts of rhubarb nor fresh undiluted ox bile have any distinct germicidal action upon dysentery bacilli under the conditions of the tests employed, nor does the serum of an animal which has been treated with rhubarb seem to act in this way. The nature of whatever therapeutic action rhubarb may have in this disease, therefore, still remains obscure.

I am indebted to Dr. T. A. Henry, Director of the Wellcome Chemical Research Laboratories, for kindly supplying me with the various extracts of rhubarb.

[1] THE LANCET, 1921, ii., 254.
[2] Trans. Chem. Soc., 1911, xcix., 946.
[3] Cent. f. Bact., 1 abt. orig., 1921, lxxxvii., 339.

Medical Societies.

MEDICAL SOCIETY OF LONDON.

A MEETING of this Society was held on Feb. 12th, LORD DAWSON, President, in the chair.

Dr. E. FARQUHAR BUZZARD opened a discussion on

Psycho-Therapeutics.

His paper was published in THE LANCET last week.

Dr. WILLIAM BROWN, after a tribute to the scholarly nature of the opening address, took up what he regarded as one or two debatable points. Dr. Buzzard had stated that in general medicine diagnosis should precede treatment; that might be agreed with in principle, but in practice the present condition of knowledge was such that a diagnosis could often not be arrived at until treatment had been well started. Sometimes general treatment—i.e., analysis—was necessary for diagnosis as well as for treatment; sometimes even a cure was reached before one could be sure of the diagnosis. Another point was the relation of psycho-therapy and its underlying theories to neurology. Dr. Brown agreed from the point of view of general conception, that there should be a close relation between theory and practice in psycho-therapy and theory and practice in neurology, but seeing that in the mental disturbances met with in border-line cases and in mild psychotic cases the mental phenomena were admittedly correlated with changes in a very complex part of the nervous system, the cerebral cortex, the correlation could only be used if there were knowledge of the functioning of the cerebral cortex; but that the physiology of the cerebral cortex was not well enough known to afford an explanation of these processes was a fact with which physiologists like Sir Charles Sherrington agreed. Therefore, although the doctrine of psycho-physical parallelism might be held, yet for a long time to come it would be necessary to deal with psychology independently of physiology. Moreover, the gap between the physiological and the psychological was unbridgeable. With regard to methods of treatment, the study of war neuroses had resulted in a great advance in psychological knowledge; this had definitely proved that Freud was right in attaching great importance to mental conflict and repression in the causation of functional symptoms; but that Freud was wrong in holding that, when tracked far enough, the fundamental cause was of a sexual nature. The war showed that fear alone was a sufficient cause of the psycho-neurotic symptoms met with. War findings had also laid emphasis on the dissociative nature of hypnosis. Forty per cent. of the cases from the firing line were those of functional amnesia with hysterical symptoms, and they were all hypnotised with great ease.

Dr. S. A. K. WILSON confessed that his views on psycho-therapy had changed to some extent since the days when he was a house physician and the old methods of treating hysteria were in vogue; yet there were types of patient with whom these were still successful, who, so long as they got better, were not curious or critical of the methods employed. In mono-symptomatic cases especially, the alleviation or removal of the symptom, or chief symptom, often started the necessary train of processes whereby the patient cured himself. But there was need for a more scientific method, and carrying out the old treatment in the wrong type of case might end in tragedy. Still, the pendulum seemed now to have swung too far in the opposite direction, for almost every type of case was being tackled by psycho-therapy, and on this subject there were many by-lanes being explored and exploited by untrained persons, paths along which the medical profession should lead. Some of the cases he saw which had been dealt with by even recognised psycho-analysts, however, made him somewhat critical. He reminded psychologists that while there was a plethora of literature on psychological subjects, there had been equal activity in the discovery of the earliest forms and signs of organic change in the nervous sytem. It was when every physical channel had been investigated that the psychologist should be asked to step in.

Dr. M. B. WRIGHT emphasised the point that unanimity was not to be expected in life; there were so many types, and there were numerous sets of people who had their own special views as to how life should be looked at. The enormous amount of work which had been done in connexion with the new psychology should not be ignored or belittled. Psycho-analysis was, first of all, an investigation into the mental life of the individual. Much of the criticism against it was unfair because it was made by people who had not conscientiously applied the method to a single concrete case. It required much time, and was often very difficult, as it dealt in many cases with the whole life of the patient. The great future of the method lay in its application to the young, in the nursery and the school.

Dr. DAVID FORSYTH said the disadvantage of most of the methods of psycho-therapy which had been employed was that they were not based on any scientific foundation. Symptoms of a striking character could sometimes be relieved by mere suggestion, but the reason why the patient had developed them remained obscure. It was because of the latter difficulty that he had become attracted to psycho-analysis. As devised by Freud this was an attempt to put the whole of the mental processes on a scientific basis. In ordinary clinical medicine it was not supposed that anything occurred unless there had been a precedent cause, and that should apply to psychical manifestations also; it would lead to an investigation further and further back until a cause was found. The investigation of sex complexes was regarded by some as repugnant, yet they would admit that in the physical domain no organ or function should be an exception in the matter of inquiry and investigation.

Sir STCLAIR THOMSON related a case in which a girl of 20 visited a psycho-analyst of repute, who supplied a written report on the case from his standpoint. Sir StClair Thomson, having received the permission of the writer, read it to the meeting, preferring to make no personal comment on it.

Dr. CRICHTON MILLER said it was necessary fully to grasp the idea that there was more than one cause at work in producing the symptoms being dealt with. He thought one of the reasons of so much criticism of psycho-therapeutic work nowadays was that many psycho-therapeutists, having been produced in war-time, and having had a somewhat crude experience of disease in general, were obsessed by only one possible ætiology; hence they were continually missing points they would not have missed if they had had a longer clinical experience. He agreed that the real place for analytical psychology was not in the consulting room nor in the clinic, but in schools and nurseries. The medical profession was too apt to look upon psycho-therapeutics as a kind of last resort. He deprecated a too narrow specialism.

Dr. T. A. ROSS said many people considered psycho-analysis was a form of treatment, whereas it was a particular form of investigation. When a patient's complexes had been brought from the unconscious into consciousness he was supposed to be better because of that fact. The speaker, however, doubted that. Some practitioners declared they did not practise suggestion on their patients, but they could not help doing so. The mere patient listening without obvious manifestations of being shocked brought great comfort to the patient's mind and did much to start the curative process. With regard to the statement that Freud was wrong in the importance he attributed to sex complexes, where sex was not unearthed it was usually because the investigation stopped short of that point. Sex, being a matter of such strong repression in our present state of society, was bound to loom largely in the psychic complex.

Dr. P. F. BARTON approached the subject as one who was for 20 years a general practitioner, and dealt with the psycho-analytic method and its success in certain cases, e.g., of torticollis. He had a word to say against ridiculing or treating lightly patients' religious beliefs.

Dr. G. CRIMP related an instructive case in a young female artist, whose sex complex yielded to a patient and persistent investigation by psycho-analytic methods.

The PRESIDENT paid a high tribute to Freud as a great and independent thinker, though he could not be held responsible for all the developments of his disciples. The mind always had played, and must play, a large part in clinical medicine; and he thought it must take an increasing part as civilisation progressed in producing clinical pictures of disease; these pictures would be more and more coloured by the environment of the world. He agreed it was a matter of regret that so few psychologists had had a wide clinical experience in a large hospital before they practised this specialty. Psycho-analysis carried with it certain disadvantages; its length, the tendency to introspection, the bringing into greater prominence of the ego. And the stressing of sex could be extraordinarily dangerous; sex instincts should be kept in abeyance by other faculties. The example which Sir StClair Thomson read out was horrifying, and it was a humiliation to realise that any medical man could write such nonsense. A splendid field lay open to the specialist in this line of investigation in difficult cases.

ABERDEEN MEDICO-CHIRURGICAL SOCIETY.

A MEETING of this Society was held on Feb. 1st, with Dr. ALEXANDER OGSTON, the President, in the chair, when an address on the

Art of Limb-Fitting: A Plea for the Standardisation of Amputations

was given by Dr. MIDDLETON CONNON. From the experience of five years at the Orthopædic Annexe and Limbless Centre, Ministry of Pensions, Aberdeen, with the supervision of some 1400 cases, Dr. Connon drew some valuable practical arguments in advocating reforms in the performance of amputations in civil surgery. He pointed out that, in spite of the fact that the surgeon in civil cases had the selection of the site of amputation, in too many cases there was a tendency to conform unnecessarily to the "classical" amputations; and that in such cases coöperation between the surgeon and the limb-fitter was essential in dealing with the problems presented. As a result of war experience it had been found that only certain amputations could be fitted with satisfaction to all concerned; other "classical" amputations, which had proved impracticable as a limb-fitting proposition, should, Dr. Connon maintained, be deleted from the text-books, and relegated to lectures on the history of surgery. He reviewed the sites of amputations of the extremities most likely to be satisfactorily fitted, the reasons for their selection, and the stumps which had proved unsatisfactory. He also referred to the great importance of education in the use of an artificial limb, holding that the best method was to start the patient, as soon as the stump was ready, with the artificial limb which he was permanently to have, the limb not being finished off until all adjustments necessitated by the shrinkage of the stump had been made. He deprecated the use of temporary legs, plaster pylons, and so forth. At the conclusion of the paper, various models of artificial limbs were shown by representatives of limb-making firms who were present, and Dr. Connon showed a number of his patients who had been fitted with limbs, and demonstrated their ability to use them to full advantage.

A short discussion followed, in which Prof. J. MARNOCH, Mr. ALEXANDER DON, and the PRESIDENT took part. Dr. Connon's suggestions as to the teaching of "classical" amputations were generally supported.

MANCHESTER MEDICAL SOCIETY.

A MEETING of this Society was held on Feb. 7th, Sir WILLIAM MILLIGAN being in the chair.

Colonel L. W. HARRISON read a paper on

Public Measures for the Treatment of Venereal Diseases.

He said that, as a result of the Royal Commission's recommendations, public authorities were asked by the Local Government Board, and later the Ministry of Health, to frame schemes for the treatment of venereal disease. The principle underlying the recommendations was to stop the spread of venereal disease by rendering the greatest possible number of the infected population non-infective. Conceivably a local authority, when required to frame a scheme for rendering the greatest possible number of the infected of its population non-infective would think out: 1. What were the kinds of people likely to be infected. 2. How to persuade these infected people to consent to treatment. 3. How to keep them under treatment until they had become permanently non-infective. 4. The provision of treatment centres. The people likely to require attention were: 1. Those suffering from active diseases as a consequence of fairly recent sexual misconduct. 2. Those who had been infected in the past but believed themselves cured and were discovered only by reason of having communicated the disease to others, such as wives or children. 3. Those who had acquired gonorrhœa or syphilis innocently, such as wives of infected husbands and their children.

Treatment for Those Innocently Infected.

The innocently affected might require special provision for treatment owing to their probable objection to attendance at a venereal clinic, and Colonel Harrison strongly advised that this provision should be made at existing maternity and child welfare centres. The treatment of infected mothers had given most valuable results in the prevention of congenital syphilis, and no V.D. scheme could be considered complete without the fullest provision for treatment of infected parents. It was not fair that a child should start life handicapped by inherited syphilis, and local authorities should ask themselves anxiously if they were carrying out completely the comparatively simple task of preventing it. Those who were discovered by reason of having infected others should be secured by a system under which wives were persuaded by social workers to send their infected husbands for treatment. Such a system was in operation at St. Thomas's Hospital, and many whole families had been brought under treatment by it.

Treatment for the Ordinary Case.

As to the arrangements for the main body of the infected, Colonel Harrison pointed out the disadvantage of treating large numbers of venereal cases in premises ill-adapted for the purpose, such as out-patient rooms of hospitals. It was economically unsound, as it wasted man-power very seriously and it led to defaulting on the part of the patients, since medical officers did not get a proper chance of treating their cases efficiently, especially in gonorrhœa, and the patients sooner became tired of attending. Experience had shown that premises specially designed for the purpose were necessary if the scheme was to be a success. In many cases voluntary hospitals had not made good provision for venereal treatment, and it would have been better in many cases to have established centres in separate premises. The theoretical objection to "ad hoc" clinics had not been substantiated by experience; they had proved to be just as successful as, if not more so than, the average clinic established in a voluntary hospital, and in future if a voluntary hospital was not willing to give the facilities required for completely efficient work, he would have no hesitation, in towns of any size at any rate, in recommending the provision of "ad hoc" centres.

With regard to the number of centres for a given size population, he thought that these should be few

rather than many, since transport was easy and a large centre was more economical than a small one. Clinics of any size should be open all day, say, from 8 A.M. to 10 P.M., in order that patients might attend for intermediate treatment at hours convenient to themselves. Intermediate treatment was a daily business and likely to prove irksome in some cases; it was less so, naturally, if the patient could easily fit it in with his private engagements. It was a great advantage also if new cases could be seen at any hour, but the provision for this naturally depended on the size of the centre.

[A number of slides of the V.D. treatment centre at St. Thomas's Hospital and of the type plans of centres issued by the Ministry of Health were shown here to illustrate the lecturer's ideas on the internal arrangements of treatment centres.]

The St. Thomas's Hospital centre had existed, he said, for nearly three years and was judged to be a success. The initial cost was high, but the running expenses were considerably lower than the average—in fact, the lecturer showed that the whole treatment required for the London area could be carried out in five centres at a cost which was £16,000 less than was at present being spent, though the London centres were not more expensive than those in the large provincial towns.

With regard to the staffing arrangements, Colonel Harrison held strongly that each treatment centre should be under the control of one director, and he expressed his view of the great advantages which accrued to the public when the director of a centre was thoroughly imbued with the public health spirit. He pointed out that his work is to protect the community from venereal disease and that the treatment which he directs is to be regarded in the light of a means to that end. For the same reason he considered as most important that the closest sympathy should exist between the public health department and the directors of V.D. treatment centres. At present those in charge of treatment centres were too closely shut up in water-tight compartments, and regarded their patients rather from the individual than from the public health point of view. This was a public health scheme, designed to render non-infective the greatest possible number of infected persons, and he considered that that end would be served only by the determination of all concerned to allow no other consideration than its attainment to prevail in their councils on the subject.

BRIGHTON AND SUSSEX MEDICO-CHIRURGICAL SOCIETY.

A MEETING of this Society was held recently, Dr. D. W. LIVINGSTONE, Vice-President, being in the chair.

Dr. D. H. RICHARDS and Mr. GEOFFREY BATE read notes of two cases of

Androgynoid Pseudo-hermaphroditism.

Dr. Richards said that the two cases were sisters, aged 21 and 18, and that his attention had been drawn to the cases by his having been called to the first as an emergency—the girl (?) having a painful and irreducible swelling in the groin. Inquiry and examination showed that although she was to all outward appearances a girl, she had never menstruated. Suspecting the nature of the case he sent the patient to Mr. Bate at the County Hospital. The nature of the first case having been decided, he made inquiry as to the rest of the family and found that the younger girl had swellings in both groins and had a similar history as to menstruation. A younger sister, aged 14, is now suspected of being in a similar condition but has not yet been examined.

Mr. Bate said that before operating on the first case he had carefully examined the patient. Externally the whole configuration of the body was feminine; the breasts were very fully developed although pubic hair was almost absent; the labia, clitoris, and hymen were normal but somewhat small. Careful examination of the vagina through a Kelly's speculum failed to reveal any cervix or sign of any cervical canal. The vagina ended about 1½ inches from the hymen in a rounded roof. Bimanual examination, though difficult owing to the small size of the orifice, failed to reveal any evidence of uterus, ovaries, or tubes, though there was a very slight median thickening of the vaginal vault in the middle line. The inguinal swelling, when removed, proved to consist of a rounded body with a thick fibrous coat, to which was attached a small cyst. This body, when examined, was found to be a testis, and was attached below by a firm gubernaculum to the pubes, and was continued upwards in a cord which passed out of reach towards the kidney. The second case was in every way similar, though swellings were present and removed from both groins. The elder girl was distinctly feminine in her ways and was pretty. The second girl, though apparently feminine, was less of the "pretty" type than her sister, and she presented the bilateral swellings which proved to be even more definitely developed testes than in her "sister's" case. Mr. Bate illustrated his notes by lantern slides showing the feminine characteristics of the patients and the histology of the testes removed.

Dr. H. M. GALT said that although the lantern slides were not quite satisfactory owing to the staining not being suitable for lantern work, the slides themselves were on view and the appearances were quite clear. There could be no doubt whatever about the structures present. Although the development was to a certain extent of the infantile or immature type the typical testicular structures were all present. There was a well-marked tunica albuginea, and in the more central portions of the sections the tubuli seminiferi were present in abundance and were quite characteristic, showing the convoluted structure of the tubes and the lining of the special columnar cells. He said that from the appearances there was little doubt that the organs were functionally inactive, and that there was only a rudimentary fibrous mass representing the epididymis. There was also shown in one section what appeared to be a rudimentary vas deferens; this was in the form of a thick-walled muscular tube but without any definite mucous membrane.

Mr. BATE showed two cases of

Pseudo-coxalgia,

one bilateral, and a case of traumatic epiphysitis of the hip for comparison. He then read a paper on the former condition, showing a series of some 30 lantern slides illustrative of the condition, including radiograms of the cases shown and of other morbid conditions of the hip for comparison. He discussed the ætiology and treatment of the condition and emphasised the absolute necessity of radiographic evidence in the diagnosis.

MIDLAND MEDICAL SOCIETY.

EXHIBITION OF CASES AND SPECIMENS.

A MEETING of this Society was held in the Medical Institute, Birmingham, on Jan. 31st. Dr. C. E. PURSLOW, the President, took the chair.

An Intracranial Lesion for Diagnosis.

Dr. J. D. STANLEY showed a patient with an intracranial lesion for diagnosis. The case was that of a middle-aged man, who had definite paralysis of the third, fourth, fifth, sixth, and seventh cranial nerves on the left side, with no signs of spasticity of the lower limbs. The cranial nerves on the right side were normal. Dr. Stanley believed that the man had a "surface" lesion on the left side of the mid-brain, but pointed out that it was difficult to conceive a lesion of this type which would spare the right third nerve. The W.R. was negative and radiograms did

not help.—Mr. BEATSON HIRD, speaking of the appearance of the left eye, which was immobile, anæsthetic, and secondarily infected, said he had seen similar conditions resulting from tumours near the basi-sphenoid.—Dr. STANLEY BARNES agreed with Dr. Stanley that this lesion was a surface one. In his opinion the lesion extended backwards from the foramen lacerum anterius, and was probably either a tumour of the dura mater or a slow suppurative process beneath it.

Œdema of Leg Associated with Albuminuria.

Dr. J. W. RUSSELL showed a young woman who had œdema of the left foot and leg associated with albuminuria. The œdema was always worse in summer. He stated that some time ago he had seen another exactly similar case. Physical examination revealed nothing abnormal, but on screening the chest, Dr. H. Black had drawn attention to a very definite scoliosis. Investigation of the albuminuria following various postures had led to the interesting conclusion that it was derived principally, if not entirely, from one kidney. Dr. Russell had been completely unable to find any plausible explanation for this curious association of unilateral œdema with albuminuria, until Prof. J. C. Brash had suggested that it might depend on the presence of a subcardial vein on one side, a rather unusual anatomical abnormality.

Mr. A. W. NUTHALL suggested that the ureters should be catheterised, but Dr. Russell thought this unjustifiable in the case of a perfectly healthy young woman.

Excision of Upper End of Femur.

Mr. G. P. MILLS showed a patient after excision of the upper end of the femur (the operation had been undertaken for dislocation of the hip-joint after septic arthritis). The surgical result was disappointing inasmuch as the shaft of the bone had not remained in the acetabulum. The functional result, however, was excellent as the patient got about comfortably, and could walk a considerable distance, whereas prior to the operation she had been crippled and had suffered much pain.

Mr. Mills also showed two children after successful tendon transplantation.

Mr. NAUGHTON DUNN congratulated Mr. Mills on his results. He stated that tendon transplantation was usually successful, providing that the fundamental principle underlying it was not neglected—namely, that a muscle used for replacing another should be one with which the latter was usually associated in function.

Suprarenal Tumour with Metastases in Skull.

Mr. R. G. ABRAHAMS showed specimens from a case of suprarenal tumour with metastases in the skull. The primary tumour had been palpable before any metastasis had appeared. This, Mr. Abrahams stated, was very unusual, but in the course of a brief discussion, Dr. STANLEY and Dr. A. P. THOMSON stated that they had had similar cases.—Mr. NUTHALL discussed the question of surgical interference in those cases in which the abdominal tumour was palpable, and there was no obvious metastasis.

HUNTERIAN SOCIETY: ANNUAL DINNER.—The annual dinner of this society was held at the Café Royal on Feb. 13th, Dr. Fortescue Fox, the President, in the chair. After the loyal toasts the Memory of John Hunter was celebrated in silence. Mr. James Berry then proposed the health of the Hunterian Society, to which the President replied with a statement of the position in which the society now stands, a position which has so rapidly improved that future success might, he thought, be taken for granted. The toast of the Royal Colleges and Kindred Societies was briefly proposed by Sir Arbuthnot Lane, the responses coming from Sir Humphry Rolleston, Sir Anthony Bowlby, and Dr. Campbell McClure. The toast of the Guests, proposed by Dr. Langdon Brown, was replied to in amusing terms by Sir Francis Newbolt, K.C., and the Very Rev. Dean Inge. There was a large attendance, the number of ladies being unusual, and the speeches were interspersed with songs.

Reviews and Notices of Books.

APPLIED PHARMACOLOGY.

By A. J. CLARK, M.D., F.R.C.P., Professor of Pharmacology in the University of London. London: J. and A. Churchill. 1923. Pp. 390. 15*s*.

THIS book differs much from other pharmacologies. It does not show what one may call the bare bones of pharmacological facts to any great extent: it is physiological function which is brought to the front. At times we find before us, as we read, a rational therapeutic volume, at others we might be reading an extraordinarily interesting manual of physiology, which is thoroughly up-to-date and puts to shame, in its lucidity, many recent works professedly on that subject. The main characteristic of the book is that, while the subjects selected are therapeutic, the analysis of these subjects is pharmacological, and the pharmacology is based, as it should be, on physiology. No drugs are discussed which are of scientific interest only, in so far that they cannot be applied to human beings, and, on the other hand, no note is made of the numerous drugs in therapeutic use of which the pharmacology is entirely unknown. These two limitations allow the book to be compressed into reasonably modest space.

The first few chapters centre round disinfectants and drugs which destroy parasites of all types. Then, with alcohol, we pass on to the nervous system, and from that to the other systems of the body. The last part of the book is devoted to subjects which have only recently made their way into pharmacology: vitamins, radiations, endocrine glands, immunity, the action of products of protein breakdown, and the physiological standardisation of drugs. It will be seen that the subject is treated in logical sequence, unhampered by time-worn ideas and formulæ. The book will be very useful to all practitioners who, with a practical knowledge of remedies, wish to bring themselves up-to-date in the application of modern physiology and pharmacology to the drugs they have in everyday use.

The charm of the book lies largely in the fact that it gives in readable and not too technical language just what the thinking practitioner wants to know about his drugs. For the medical student this book may not suffice, since his syllabus is not completely covered; but with whatever manual he chooses to fill the gaps, he will be well advised to study Prof. Clark's book before he goes forth to practise.

DISEASES OF THE GUMS AND ORAL MUCOUS MEMBRANE.

By Sir KENNETH GOADBY, K.B.E., M.R.C.S., D.P.H. Cantab. Oxford Medical Publications. London: Henry Frowde and Hodder and Stoughton. 1923. With 106 illustrations in the text and 8 coloured plates. Pp. 366. £2 2*s*.

IN this volume Sir Kenneth Goadby has given an account not only of the diseases and disorders of the gums and mucous membrane of the mouth, but has described mouth symptoms and signs in certain general diseases. He has also sketched with vigour the effect of unsatisfactory mouth conditions upon general health. He has omitted description of disorders of the teeth. There has been of recent years an unfortunate tendency to confuse gingivitis with pyorrhœa; the author's teaching on the subject is clear, he is at pains to describe in detail what pyorrhœa is, how it may affect general and local health, and how it should be treated, but he is very careful to describe the differential diagnosis between pyorrhœa and other conditions bearing a superficial resemblance to it.

On the question of wholesale dental extractions his teaching is very sound; it amounts to this: first prove the case against the tooth or teeth, then, if sentence of execution must be passed, let the clearance of the mouth be carried out in small stages; he

points out the danger of opening up flood-gates of sepsis by wholesale extractions at one sitting. The practice of removal of teeth as a diagnostic measure is strongly condemned; with the use of the simple diagnostic methods described in this book it should be possible to recognise the condition of the tooth-socket without recourse to preliminary extraction. X ray diagnosis is well described; the danger of regarding localised areas of rarefaction as evidence of incurable bone destruction is emphasised and the possibility of temporary calcium deficiency of the alveolus is pointed out. The simulation of X ray appearances of periodontal disease by the senile thickening of the cementum is demonstrated by useful plates. The author writes with authority upon the oral manifestations of metallic poisoning; he regards the "blue line" as evidence of lead absorption, but not necessarily of lead poisoning, and notes how rapidly it may disappear on protection of the worker from lead or the removal of tartar.

A considerable section of the book deals with the bacteriology of the mouth: the organisms of Vincent's angina and its allied conditions are fully described. There is a useful chapter upon the causes, manifestations, and treatment of facial neuralgia. The author is impressed by the work of E. Mellanby on the effect of vitamin deficiency in the food of the child or the nursing mother upon the jaw and gums of the infant, and he points out that rickets may have effects upon these which, though they may easily pass unrecognised at the time, may be associated with more obvious trouble later in life.

The value of the book is increased by many microphotographs and plates of a high order and by an unusually complete index.

DISEASES OF INFANCY AND CHILDHOOD.

Their Dietetic, Hygienic, and Medical Treatment. Ninth revised edition. By LOUIS FISCHER, M.D., Attending Physician to the Willard Parker and Riverside Hospitals of New York City; Physician in Charge of the Infantorium, &c. Philadelphia: F. A. Davis Company. 1922. In two volumes. Pp. 1152. $12.00.

THIS work has already run through eight editions. It deals not only with general diseases, but also with the acute infections and much matter that is usually left to treatises on special subjects. The two volumes contain nearly four hundred illustrations, of which many are reproduced in colour. In spite of the size of the work many important diseases are dismissed with unusual brevity, whilst other articles contain statements scarcely in accord with orthodox teaching. Thus, an underlined paragraph on p. 322, which states that "Intussusception usually causes a distension of the abdomen from the side of the cæcum," conveys —if we have understood the author's meaning—an idea quite contrary to the belief of most experienced observers. This is but one example of the evidence of hasty writing which has impressed us whilst reading these volumes; we hope that the future may see them corrected, as they detract from the book's value. The descriptions of many modern reactions, such as the Schick reaction, and the responses to foreign protein inoculation are very thorough.

CHEMISTRY.

***Smith's Intermediate Chemistry.* Revised and re-written by JAMES KENDALL, Professor of Chemistry, Columbia University, New York; and EDWIN E. SLOSSON, Editor of *Science Service*. New York: The Century Co. 1922. Pp. 566. 8s. 6d.**

IN modest compass, the revised and re-written edition of this book forms a useful foundation to the subject of chemistry. It contains the minimum that every student, whether of science or medicine or other technical profession, should know. A student having read it will desire to extend his information, and there are not many authors who can impart facts, explain their meaning, and at the same time produce a wish for more. In the introduction, under the title "Why Study Chemistry?," Mr. Slosson gives many sound justifications for this study, among them that "Chemistry is especially fitted to give training in scientific thought, for it is experimental from the start and if properly learned inculcates self-reliance and independence of thought. In its manifold bearings it has an interest and usefulness for everyone, as it gives an understanding of household arts and modern manufactures, of the principles of agriculture and bodily processes, and because it opens the mind to the molecular meaning of the marvellous metamorphoses of the visible world." Many portraits are included among the illustrations, which also show the practical side of chemistry in the making of smoke-screens against submarines, the plant for the manufacture of caustic soda, the use of thermite. The student who reads this book carefully and answers the questions at the end of each chapter must gain valuable knowledge.

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1. ***Second Year College Chemistry.* By WILLIAM H. CHAPIN, Associate Professor of Chemistry in Oberlin College, U.S.A. London: Chapman and Hall, Ltd.; New York: John Wiley and Sons, Inc. 1922. Pp. 311. 15s.**
2. ***Second Year College Chemistry; A Manual of Laboratory Exercises.* By WILLIAM H. CHAPIN. Same publishers. 1922. Pp. 115. 7s. 6d.**

1. Though general principles may be introduced into the first year of study of chemistry, they do not usually form the basis of the young student's knowledge. He must first acquire the main facts, on the basis of which general principles can be built. Prof. Chapin in this book recapitulates and enlarges upon the principles enunciated in the first year. He deals with the structure of matter and the kinetic theory, the gas laws, laws of chemical combination, atomic and molecular weights, and leads on to periodic classification, solubility, ionisation, equilibrium. The matter of each chapter is treated shortly and clearly, with some emphasis upon the historical stages by which advance has been made. A little amplification appears to be necessary in some of the chapters, but most of them the student will be able to read and comprehend quite easily. The introduction of theory in the ordinary text-books may become cumbersome, and it is a good plan to have the theoretical portion of the subject dealt with separately.

2. The book on theory is accompanied by a Manual of Laboratory Exercises, chosen to illustrate Prof. Chapin's course of lectures. All the experiments mentioned have been thoroughly tested, and as they are well described students should have no difficulty in working through the course and obtaining good results. The experiments are mainly quantitative and do not need elaborate apparatus. Their performance should promote manipulative skill and encourage the improvisation of means to a definite end. This system of making the practical course connect closely with the theoretical side of the subject is highly to be commended. We find too often that the practical work in chemistry bears no relation to the lecture work, and consequently the latter suffers. Practical work is not stimulating to the student unless it bears upon the other work in hand at the moment. Many of the experiments might with advantage be introduced into the course of the medical student; quantitative work is likely to be more helpful to him as a foundation than the rather aimless identification of unknown substances favoured at present.

JOURNALS.

QUARTERLY JOURNAL OF MEDICINE.—The January number contains the following articles: A Study of Orthostatic Albuminuria by Means of Graphic Records, by James W. Russell. A rapid clinical method for determining small amounts of albumin is described, in which the protein to be estimated is coagulated and the turbidity produced compared with a fluid containing a standard haze, using a Gowers's hæmoglobin apparatus. Hourly estimations were made

upon the albumin excretion in cases admitted to hospital as orthostatic albuminuria and mild types of nephritis. In none of the cases examined was the early morning (bed) urine invariably albumin free. In those cases which conformed most strictly with the orthostatic type, standing gave rise to an immediate albuminuria, whereas in the nephritic type there is a postural albumin response, which is not, however, immediate.—The Fractional Test-Meal in the Study of Disorders of the Gastro-intestinal Tract (an Analysis of 174 Verified Cases), by Donald Hunter. The cases reported in this series include ulcers of the stomach and duodenum, carcinoma of the stomach, chronic appendicitis, gall-stones, visceroptosis, and cirrhosis of the liver. In each instance the diagnosis was verified either by operation or by autopsy. The author gives a full account of the gastric contents as revealed by the fractional method of gastric analysis.—Muscular Exercise, Lactic Acid, and the Supply and Utilisation of Oxygen, by A. V. Hill and Hartley Lupton. In this important research into the physical and chemical mechanism of living muscle, the principles already established in respect of the physiology of isolated frog's muscle have been found to hold good in many instances when applied to muscular exercise in normal man. The article is divided into several sections dealing amongst others with the function of oxidation in the body, the rôle of lactic acid in the muscles, heat production, the efficiency and speed of the recovery process, the production of lactic acid in man, and tissue buffer substances. The journal concludes with an account of the proceedings of the Association of Physicians of Great Britain and Ireland at the fifteenth annual meeting held at Oxford last April.

BRITISH JOURNAL OF SURGERY.—In the January number the seventh eponym by Sir D'Arcy Power is on Percival Pott's fracture.—John H. Anderson describes four examples of abnormalities in the duodenum. There was one case each of abnormal shape, abnormal position, constriction due to the superior mesenteric vessels, and to an annular pancreas.—Matthew J. Stewart reports a case in a child of a large myeloid growth in the radius, which was pale throughout. The author always refers to the growth as a myeloid sarcoma (myeloma), illustrating at the same time how obscure is the pathology of these conditions, and how unsatisfactory the nomenclature.—W. Girling Ball contributes an instructive article on the cystoscopic appearances in tuberculosis of the urinary tract, and emphasises their importance in the diagnosis of renal tuberculosis. Thirteen illustrations by Mr. Thornton Shiells add considerably to the value of this paper.—C. E. Shattock records a case of an embryoma of the ovary removed from a child of 2½ years; the tumour consisted of a hydrocephalic fœtal head.—Prof. William Boyd, as the result of research on the strawberry gall-bladder, and on the gall-bladders of animals, concludes that the function of this suspect organ is undoubtedly absorption, and that possibly one of the chief substances absorbed is the cholesterol of the bile. Moreover, in cases of early cholecystitis deposits of cholesterol ester are found in the mucosa of the gall-bladder.—A. P. Bertwistle suggests that much of the value of X ray prints is lost because the outlines of the soft parts are so indistinct, and he has obviated this by filling in the background of the negative before printing.—W. H. Bowen describes his visits to the surgical clinics of Crile and the Mayos, with special reference to thyroid surgery.—A. K. Henry describes a method of approaching the left subclavian artery by performing a costo-transversectomy at the level of the second left rib. Depression of the pleural dome then leaves the artery exposed and quite accessible for ligation.—G. R. Girdlestone reviews 100 cases of spinal fixation in children and adults, and concludes that in the former posterior spinal fixation is seldom, if ever, needed; whereas in the latter it is reliable and of great value.—H. P. Pickerill reports a case of phosphorus necrosis of the jaw.—W. G. Spencer publishes his Vicary lecture on Vesalius: His Delineation of the Framework of the Human Body in the "Fabrica" and the "Epitome."—E. F. Guy has examined 50 patients, by fractional test-meals, on whom a gastro-enterostomy had been performed, and has come to the conclusion that his evidence supports the drainage theory of the operation.—John Morley reports two cases of a congenital cyst of the common bile-duct. The following rare or obscure cases are recorded:—Sir Hugh Rigby: Acute hæmorrhagic pancreatitis due to a round worm in the pancreatic duct. Lieut.-Colonel Novis: A similar case. H. Temple Mursell: Intestinal obstruction from a hydronephrosis in a pelvic kidney. W. G. Spencer: (1) A pelvic hæmatocele in a male, unnoticed until infected from the intestine; (2) endothelioma of the left kidney, extending down the ureter and projecting into the bladder; (3) large intraperitoneal (? parovarian) cyst disappearing after drainage. R. M. Handfield-Jones: Two cases of ruptured sigmoid colon.

BRAIN. Vol. XLV., Part 2.—Réflexes de Défense, by J. Babinski. This lecture contains a summary of the study of the defensive reflexes, including a criticism of the latest work by George Riddoch and F. M. R. Walsh. Prof. Babinski suggests that the different forms of the reflex—namely, quadruple flexion, triple flexion with extension of the great toe, and flexion of the toes—may be considered respectively physiological, a reflex of primitive defence and an atavistic reflex of attack.—A Study of the Sherrington Decerebrate Animal in the Chronic as well as the Acute Condition, by H. C. Bazett and W. G. Penfield, is an exhaustive research on decerebrate cats; by artificial maintenance of a normal body temperature the cats were kept alive for days and occasionally as long as three weeks. Extensor rigidity is usually maintained, even though the influence of the red nucleus is completely removed. Decerebrate rigidity is considered by the authors as probably dependent on some centre or reflex arc at about the level of Deiters's nucleus. The preparations show no sign of temperature control and never shiver. In the later stages there is a much greater tendency for flexed positions to be assumed. Vocalisation was noted in only 10 of the 124 complete decerebrations; many showed a well-developed mastication reflex. Acoustic reflexes become more brisk after the first few days; glycosuria persists for two or three days and then disappears. In semi-decerebrate animals forced movements were always directed away from the side of removal. The experiments indicated that "the pathway whose interruption is responsible for extensor rigidity decussates in the mid-brain." A condition of increased resistance of the flexor muscles to passive extension, which alternated with extensor rigidity, is described. The authors hold, therefore, that it is possible to speak of two types of decerebrate rigidity.—The Pathogenesis of Subacute Combined Degeneration of the Spinal Cord, with Special Reference to its Connexion with Addison's (Pernicious) Anæmia, Achlorhydria, and Intestinal Infection, by A. F. Hurst and J. R. Bell. The authors maintain that the achlorhydria is an essential predisposing cause of the anæmia and also of the subacute combined degeneration of the cord, by allowing unchecked infection of the duodenum by organisms swallowed from the mouth. They recommend that a drachm and a half of diluted hydrochloric acid in six ounces of water should be taken at each meal, in addition to rigorous measures for removing oral sepsis and vaccines.—The Meningiomas (Dural Endotheliomas): their Source and Favoured Seats of Origin, by Harvey Cushing. The author traces their origin to cell clusters formed by proliferation of the endothelium of the arachnoid villi. Such proliferation has been shown to occur when the villi are experimentally blocked by particulate matter; under certain circumstances, obscurely related to the genesis of tumour formation in general, some of the cell clusters show neoplastic tendencies. The meningiomas are shown to occur in connexion with the dural venous sinuses with which the villi are also in relation.

THE LANCET.

LONDON: SATURDAY, FEBRUARY 24, 1923.

THE MYSTERY OF MAN.

THE man to whose distinguished lot it falls to be invited to deliver the Hunterian Oration before the Royal College of Surgeons of England may be embarrassed as well as flattered. JOHN HUNTER can be described as the patron saint of surgery, as we now understand the art and science, while the College which enshrines his museum may, with little exaggeration, be termed his temple. Surgery, as built up by the wisdom and learning of HUNTER'S forerunners, was placed immediately upon a different plane by his theories and his practice, by his enormous generalisations and his relentless devotion to details, by his far ranges of study and his close concentration upon the central scheme which his researches laid bare before him. HUNTER was primarily a practical worker, and the weak spot in his equipment was his unequal and misty method of exposition. A long line of followers have delivered to his College an Oration in his honour, and have found their texts, now in some phase of HUNTER'S multifarious work, now in the fulfilment of a striking prediction, now in the moral to be drawn from his passionate and inspired researches; and many of these addresses have been examples of that literary gift which HUNTER did not possess, or did not cultivate. In this way, and often splendidly, the Hunterian Orations have filled gaps in the Hunterian prophecies.

It can therefore be well understood that to-day the Hunterian Orator must wonder what remains to be said about a saint so definitely canonised and so assiduously celebrated. Some of the embarrassment of these orators has before now communicated itself to their audiences, but Sir JOHN BLAND-SUTTON'S Oration, which was published in our columns last week, betrayed no doubt as to the manner in which his tribute would be paid, whilst he elicited from the audience, as well as the reverent attention due to a memorial address, the unusual and yet perfectly natural concomitant of laughter. He narrated simply the events of HUNTER'S life, and showed that the mainspring of his wonderful performances was the readiness to use opportunity. HUNTER'S magnificent curiosity urged him forward upon different tracks. His early lessons as a handicraftsman he applied as a dissector; what he learned as a dissector he utilised as a biologist; and the results of his biological investigations became the foundation of modern surgery, viewed as a grand development of anatomy and physiology. In telling the story BLAND-SUTTON revealed how veritably HUNTER had been to him a patron saint, a saint with whom he, like any mediæval monk, could joke while paying him reverence; he had followed his leader's footsteps geographically as well as mentally, and was able to illustrate the meaning of HUNTER'S many-sided activities by examples drawn from the learning of to-day, the results of refined and intensive observation quite impossible to the investigators of the eighteenth century. And in so doing the Hunterian Orator preached, unwittingly or no, a doctrine of the finest hope, for every word of his studiously simple address conveyed the lesson that the study of natural science is reinforced from every source, and that all our philosophy, learning, poetry, and religious faith may well be aspects of the same synthetic truth.

At the Festival Dinner held at the College after the delivery of the Oration, Mr. RUDYARD KIPLING approached the subject of JOHN HUNTER through the medium of BLAND-SUTTON'S words, and everyone should study the great author's tribute to the part played by medicine in interpreting the mystery of man. "Man," said KIPLING, "the imperfectly denatured animal, who cannot trust the evidence of his own senses in the simplest matter of fact; whose evidence on the simplest matter is coloured by his own iniquities; Man, always the hunter, went up against the darkness that cloaked him and every act of his being, to find out what order of created being he might be. He called it scientific research. It was the old quest under a new name. But, this time, the seekers who headed it, unlike the Priest and the Lawyer, admitted that they knew very little. Experience had taught them to be humble. For that reason their knowledge was increased." No sweeter or truer words could have been used to describe the leaders of scientific research. To probe, to question, and to doubt have comprised their duty; but discharge of that duty, when faithful, has compelled them to be humble in the presence of the vast revelations which have followed, and to-day, at least, they are willing to learn from and ready to coöperate with the philosopher, the divine, and the poet in the discovery of the grand synthesis, the nature of man.

THE PRESENT POSITION OF PSYCHO-THERAPEUTICS.

THE general interest aroused in the theory and practice of psychotherapy, partly as a sequel to the experiences of the late war, partly as the expression of a steady tendency, observable in other departments of medicine as well, towards a rational as opposed to a symptomatological therapeusis, shows no sign of abatement. Willing or no, the practitioner cannot escape a subject which is fastened on at intervals by editors of newspapers for topical if superficial discussion, which provides material for debate at societies not ostensibly scientific, which his patients themselves will bring to his attention should he essay an attitude of ignorance or indifference. In a matter of this kind it is desirable to preserve at least some semblance of perspective. Psychotherapeutic activity has never, in reality, been under any cloud for at least half a century. The opposition engendered by the pioneer work of JAMES BRAID—to mention but one name out of many that have adorned the record of a hundred years—has long since vanished; scientific research, coupled with successful clinical application, has in fact been abundantly manifest from the days of CHARCOT. Schools of psychotherapy have waxed and waned, no doubt, but the effect has been gradually if imperceptibly to leaven the lump of professional unconcern and agnosticism. Of the forward impetus provided by the labours of JANET, FREUD, and JUNG, there is no need to speak; it suffices to allude merely to new journals, new books, new societies and clubs, new hospital appointments, new medical school tuition, to indicate in a sentence the gigantic strides made by a "new" psychological movement.

For good or ill, this ever-growing interest in the things of the mind, physiological and pathological,

must be taken as a sign of the times. However violent in some quarters the resistance to Freudian doctrine, however unsatisfied the critical mind in respect of not a few of the pet contentions of the "wild psycho-analyst," however impatient the conservative physician of the broad-casting of psychological jargon and psychotherapeutic method among the laity, the situation now is such that the current can no longer be withstood; it may only be guided. Far beyond the strict limits of the medical profession the echoes of the blows struck at an academic and scholastic psychology are still reverberating; it is no exaggeration to say there is scarcely a department of intellectual activity that has not felt the revivifying touch of a method of investigation based on the exploration of mental arcana hitherto more or less tacitly regarded as inaccessible. With such a rush of enthusiastic research by ardent apostles of a twentieth-century "revival of letters," it is little wonder that the coldly critical are brushed aside. The sceptic may justifiably point to the history of popular movements of the past, which have had their day and ceased to be. He may recount, to his own satisfaction, the story of ill-regulated and exploded "psychotherapy" as instanced by the enormous though transient success of Dr. ELISHA PERKINS'S metallic tractors, of this and that quack of other years whose name was for the time enshrined in the honour of an "-ism," just as—so he will have it—we speak of "Freudism" to-day. But the analogy is valueless, or, rather, paradoxically, is capable of conveying an instructive lesson. Grotesque as has often enough been the particular means employed to influence the illiterate and gullible, no one can deny the actuality of many cures thus effected by irregular practitioners, whose only claim to distinction has frequently been an inborn genius for ascertaining what their public have been looking for. Not otherwise can we explain the furore attending both older and newer exhibitions of psychotherapeutic skill by some who have little insight into their own powers, who, indeed, may have been exercising them unconsciously. The one conclusion to be derived from the unbiased study of these popular nostrums and their advocates is that there has always been an immense amount of minor and probably also of major complaint relievable by mental technique. This is the lesson taught by the history of quackery and charlatanism, or, in other instances, of genuine psychotherapy blundering and masquerading under the guise of the latest novelty in panaceas. Human nature remains much the same, as do the ills to which flesh is heir, hence we cannot be surprised at the throng besieging the portals of the skilful lay practitioner of suggestion, for in this respect history is merely repeating itself. The medical profession, however, is sadly to blame in having persistently failed to take cognisance of the import of these sometimes startling successes; instead of looking askance at any variety of healing outside the pale, it should have seized on the principle of learning from the enemy and should have seen to it that the coming generation of medical men were instructed in the art of psychotherapy. Clearly he is best provided with therapeutic resource who is also equipped with a technical knowledge of disease and of ailment, and who can distinguish and diagnose ere application of mental methods is resorted to. For every reason, then, the curriculum of the future should and must include at least a modicum of psychotherapeutic theory and technique.

We are glad to note the discussion on this subject at the Medical Society of London, reported elsewhere in our present issue. In respect of most of their audience, doubtless, the advocates of psychotherapy who took part were forcing an already open door; others, it may be, were somewhat chary of committing themselves to methods of which it may be considered the value is not yet proven. However justifiable this attitude of reserve, in certain respects, the general truth cannot possibly be assailed; "Freudism," suggestionism, hypnotism, are not the scientific fads of the hour; slowly but surely the basis on which their working is erected is being laid down, the mechanisms of the mind are being exposed, the influence of the mind over the body is being determined, and if exactitude is not quite attained it is nevertheless within reach. "The real physician is the one who cures," it has been said; "the observation which does not touch the art of healing is not that of a physician, it is that of a naturalist." Psychotherapy is open to large abuse, and has therefore been assiduously decried ever since it became an art; if it is to take the place it deserves among recognised methods of treatment this will only be by its formal study and deliberate employment by the medical profession. The responsibility must be shouldered; else ailing humanity will turn, as often before, to the man who can cure, whatever his qualifications, and will desert those whose training and knowledgableness should fit them best to minister to the mind diseased.

MEDICINE'S DEBT TO RÖNTGEN.

THE discovery of X rays by Prof. v. RÖNTGEN proved of momentous importance to physical science, for it led to the discovery of radio-activity in the following year, and introduced physicists to a new type of radiation whose place in the electro-magnetic spectrum was only finally established in 1913. It is sometimes asserted that we do not know the nature of these rays; it would, perhaps, be more appropriate to say that we do not realise their nature. That they are electro-magnetic radiations akin to light, differing only from the latter in having a much smaller wave-length and correspondingly greater frequency, can hardly be doubted, for measurements upon their wave-length are now carried out in many laboratories with an accuracy of one part in a thousand; but a long familiarity with such rays may still fail to make the user realise that the wave-lengths in question are of the order of a ten-millionth part of a millimetre, and that they follow one another with a frequency of about a million billion per second. RÖNTGEN was, in the first flush of his discovery, inclined to think that the X rays were longitudinal vibrations of the ether, but the idea was not upheld. RÖNTGEN had a long career in physics before he made the discovery, when he was about 50 years of age, which was to bring him world-wide fame. As early as the year 1878 he published work upon the conditions which regulate the passage of electrical discharges through gases at different pressures, but there seems little evidence that the discovery of X rays can be directly linked with these early measurements, nor can we point to any detailed work upon the study of gas discharge by RÖNTGEN which paved the way for the final achievements. All this was done by others, notably by PLÜCKER, who discovered the cathode stream as early as 1859, and by CROOKES, whose life-long studies upon the nature of the electrical discharge through rarefied gases led him to the view that the cathode stream was a "fourth state of matter." The discovery by J. J. THOMSON, in 1897, of the true nature of the particles, or corpuscles, as he called them, constituting the cathode stream justified to the full the attitude of CROOKES in

differentiating them from any of the usual phases of matter. There was much information which lay to hand when RÖNTGEN resumed work upon the electric discharge through gases. It would seem quite wrong to call the discovery which ensued accidental, for it was the result of careful observation following upon well-arranged experiments. But it is amazing to think how close upon this path of discovery others must have trodden.

It is difficult for those whose experience of our profession is recent to realise the change brought about by the application of X rays to medical practice. Since RÖNTGEN'S discovery was made public in December, 1895, there has been a progressive advance in its medical utilisation which has largely corresponded with, and has been made possible by, the contemporary improvements in technique. Very little time was allowed to elapse before the new discovery was put to a practical test as a means of diagnosis. In an interesting historical note,[1] Dr. H. A. COLWELL says that within a week of the first demonstration of X rays COX, of McGill University, Montreal, so successfully localised a bullet that had been in a patient's leg for six weeks that it was removed next day. The first X ray photograph in this country was taken[2] by Mr. A. A. CAMPBELL SWINTON, an electrical engineer, of his own hand on Jan. 16th, 1896, with an exposure of 20 minutes, and a week or two later an apparatus was at work in THE LANCET Laboratory. As showing how greatly the technique has now improved reference may be made to two companion skiagrams of the hand, in Dr. G. W. C. KAYE'S recent book,[3] one taken in 1896 with the 20 minutes' exposure and conveying comparatively little information, the other by Dr. ROBERT KNOX in 1921 with 1/100 second exposure, which is like a photograph of the dry bones. Investigation on these lines was extremely active in many medical centres in January, 1896, notably in Vienna by MOSETIG in Exner's Institute, and in Paris by LANNELONGUE. Sir OLIVER LODGE, in February, 1896, published a skiagram of a gunshot wound, and in the same number of the *British Medical Journal* a fracture of the finger was recorded from St. Thomas's Hospital; in March an investigation into the detection of urinary and biliary calculi, which had been introduced into the body of a dead monkey, was described in THE LANCET; at the conversazione of the Royal Society in May, the late SIDNEY ROWLAND, who had made a number of reports on the subject to the British Medical Association, exhibited 50 skiagrams; and the following September, in his presidential address to the British Association at Liverpool, Lord LISTER touched on the help that was thus rendered to surgical diagnosis. Earlier in May of this same year MACINTYRE, of Glasgow, took skiagrams of the soft parts, including the heart, and thus initiated the now familiar diagnosis of aneurysm and other intrathoracic lesions. The use of X ray bismuth meals in the diagnosis of gastro-intestinal disease and in pyelography (1906) were most valuable developments in diagnosis; more recently[4] the detection of gall-stones with greater accuracy and frequency has been a distinct advance, and within the last few years the method of introducing oxygen into the peritoneal cavity, in order to facilitate the definition of the abdominal contents, has been of further assistance in clinical diagnosis. Prof. JACOBÆUS'S thoracoscopy under the X ray screen enables pleuritic adhesions to be divided by the cautery, and thus both improves the outlook in cases of artificial pneumothorax and serves as an earnest of the future that lies before a combination of X rays and special forms of surgical treatment.

From such a brief sketch it is obvious that the introduction of X rays as a means of physical diagnosis is an advance comparable with that due to the assistance of the microscope in pathological anatomy. Equivalent to another sense it has thus become an invaluable means of confirming, correcting, and extending the conclusions derived from the ordinary methods of physical diagnosis. There is, indeed, a danger that its use in hospitals may lead students to neglect the ordinary methods of physical diagnosis which may be the only means available to practitioners in remote country districts. Not only has it revealed the living anatomy of the body, and in the case of the stomach greatly altered our ideas of its normal position, but it has thrown light on the physiology of the hollow viscera by showing their movements. The knowledge thus obtained of the normal anatomy and physiology of the abdominal viscera has been mainly, but perhaps not entirely, due to the stimulus of the needs of medicine and surgery; F. H. WILLIAMS, of Boston, appears to have begun the use of bismuth meals in 1899, but years passed by before this method came into general use, and it is interesting to note that in 1898 W. B. CANNON, when a student at Harvard, studied the movements of the stomach by means of X rays. About the therapeutic uses of radiations much remains to be ascertained, but that a very powerful agent is thus available there can be no doubt. The ill-effects of X rays became noticeable in the first year of their medical use and led to early therapeutic use as depilatories; their application has since been extended in other directions by dermatologists. The influence of X rays on new growths has long been exhaustively studied both experimentally and in practice, though the limitations of this remedy and of the intensive Erlangen treatment still await a final decision. The autolytic effect of X rays on the tissues has also been utilised in the treatment of leukæmia, of exophthalmic goitre, and of metrorrhagia, by acting on the bone marrow, the thyroid, and the ovaries respectively. But up to the present time it remains true that the value of X rays is better established in diagnosis than in treatment, and it is in respect of diagnosis that their discovery has so largely changed our outlook on medicine. To realise this it is only necessary for a surgeon to picture how he would deal with gunshot wounds, and the physician how he would diagnose thoracic and abdominal lesions, without X rays.

[1] Essay on the History of Electrotherapy and Diagnosis, 1922, p. 141.
[2] THE LANCET, 1896, i., 179, 246.
[3] Practical Application of X Rays, 1922.
[4] L. G. Cole (1914); J. T. Case; R. Knox.

THE TREATMENT OF DIABETES BY INSULIN.

WE have received from the Medical Research Council a further statement regarding the steps which are being taken in this country for making insulin available as rapidly as possible for the treatment of diabetic patients, under suitable guarantees of authenticity, potency, and safety. When the last public communication was made in November, 1922 (THE LANCET, 1922, ii., 1081), the methods of producing this substance were imperfect and necessarily wasteful, and its use in the treatment of disease was, and indeed is still, in the experimental stage. The Council are now able to report that rapid and satisfactory progress has been made as a result of research work which has been undertaken at various centres in this country in confirmation or extension of that already accomplished in the University of Toronto. Members

of the Council's scientific staff at the National Institute for Medical Research, Hampstead, have endeavoured to increase the yield of product from the raw material, to simplify, shorten, and cheapen the processes of its production, to obtain accurate measurements of potency by reference to a fixed standard of value, and finally to find the best methods of securing the bacteriological sterility of the final product. In all these directions important progress has been made. Those working for the Council have been in constant touch with the workers at Toronto, and they have both received and given full information of new developments and improvements as they have occurred. The results obtained have been made freely available for the assistance of those engaged in the other work to be mentioned below. Technical information and small samples of finished product have, so far as possible, been put at the disposal of approved scientific workers undertaking collateral lines of investigation elsewhere.

At various hospitals where the necessary facilities existed for biological and chemical work in the laboratories, and for scientific clinical studies, investigation and carefully controlled treatment under suitable safeguards have been undertaken in close association with the work of the National Institute. Insulin is being produced, standardised, and used in treatment for the relief of patients selected for the purpose at each of the following hospitals: in London, at St. Bartholomew's, Guy's, St. Thomas's, the London, and University College hospitals; in Sheffield, at the University Departments of Pharmacology and Physiology and the Royal Infirmary; in Edinburgh, at the Royal Infirmary. Arrangements are in progress for extending this work to other hospitals and institutions, where the necessary conditions, both personal and material, can be provided. The Council, lastly, have made at the same time every effort to accelerate the production of insulin upon a manufacturing scale. Experience in Canada and the United States has already shown the difficulty of passing from the small laboratory scale of production to large scale production by mechanical means, without which the product can never become generally available at reasonable cost. The Council have been in communication throughout with certain manufacturing firms in the several parts of the country with whom the Council have entered into agreements securing in the public interest a control of the safety and potency of the product and its sale at a fair price. The Council have given at the same time every assistance at their disposal by way of information likely to accelerate satisfactory production. In the promotion of manufacture by particular firms it has been necessary to consider the distribution of the available raw material and the special technical difficulties attending its collection and proper use. No royalties are payable to the Council under any of these agreements.

The Council are able to say that the progress towards successful large scale production has been more rapid than they had ventured last November to hope. This has been due equally to the laboratory investigations at the National Institute already mentioned and to the experience, skill, and enthusiasm which the firms have shown in their coöperation with the Council. The Council believe that, subject to limitations of raw material in particular districts, successful manufacture is now assured; but a period of some weeks must pass before laboratory tests and clinical use under special safeguards will have made it justifiable for a supply to be issued generally for routine use under the ordinary conditions of medical practice.

INQUIRY INTO RESULTS OF GASTRIC OPERATIONS.—The Scottish Committee of the British Medical Association has decided to institute an inquiry into the ultimate results of the operations of gastro-enterostomy and gastrectomy, and has appointed a special committee for this purpose, of which the convener is Mr. D. M. Greig, Edinburgh. Local committees will be formed in each of the four university centres to assist in the collection of data, the aim being to try to obtain complete histories of a number of cases, and to see what general conclusions may be drawn from their examination.

Annotations.

"Ne quid nimis."

THE MEDICAL OFFICER OF HEALTH.

William Farr, one of our greatest medical statisticians, prophesied in 1875 that the national standard for mortality rate was capable of considerable diminution. Farr's predictions were not and could not be based on any betterment in his time in the rates of mortality for the whole population. There would have been no ground for optimism. His faith in the future, so far as its justification was merely arithmetical, was inspired by inter-local comparisons. He pointed out, for instance, that while in "healthy" districts there was an annual mortality per cent. of boys under 5 of 4·2 and of girls of 3·5, the corresponding rates in Liverpool were 14·4 and 13·4. In an interesting address to the Society of Medical Officers of Health on Feb. 16th Dr. Major Greenwood put forward these points, and showed that from such inter-local comparisons we might still derive inspiration. Dr. Greenwood proceeded to consider to what extent the future course of mortality rates could be predicted from the available data by mathematical means, and gave technical details of the methods most likely to obtain useful results. The detailed results of a study by these methods of the course of mortality rates at different age-periods for each sex for Lancashire, London, and the South-Western counties respectively led to two conclusions: The first, and the most sombre, was that upon the sole evidence of the national rates of mortality no prudent man would stake money on the chance that the rates of mortality of adult males between 45 and 65 would decline much further. The second and more hopeful was that when rates of mortality in two great industrial areas differed by so much as 20 per cent.—as in the London and Lancastrian males, aged 55–65—the faith which inspired Farr should encourage and strengthen us. It was hard to believe that racial, industrial, or climatological differences made so great an inferiority in the north-western manufacturing area inevitable. Dr. Greenwood next considered the change in our mortality rate from enteric. He contended that the triumphs in this respect owed nearly everything to the epidemiologist, so far as the civilian community in peace time was concerned, while paying a tribute to the bacteriological work which had been the saving of thousands of lives under conditions when water and food supplies could not be shielded from contamination. It might even be that if antityphoid inoculation had been discovered in 1860 our present position would have been far worse. Simon and Farr did not stay to consider whether it might be possible to immunise the population against typhoid; they said there ought not to be any typhoid at all, and worked to that end. Dr. Greenwood spoke also of the diseases responsible for the excessive mortality of later adult ages, which were unfortunately for the most part diseases which the medical officer of health considered to be outside his sphere of action. He concluded by a reference to the psychological factor, especially in so far as it concerned the tedium of life to the middle-aged. Dr. Greenwood ended with what he termed his rashest prophesy, that when the medical officer of health was a psychologist, as well as a bacteriologist, a legal expert, a eugenist, a statistician, and all the other things he was now, we should see a further decrement of mortality at the most unpromising time of life.

DISTEMPER RESEARCH AND COMPARATIVE MEDICINE.

THE lack of active coöperation between human and veterinary medicine has been recognised for some time as constituting a serious reflection on both branches of the curative profession. Disease is ubiquitous in the animal kingdom, and the artificial limitation of the study of morbid processes by species or genera is as

illogical as it is inimical to progress. A movement which should lead to a valuable development of comparative pathology is that exemplified in an appeal being made through the press, headed by the *Field* and enthusiastically welcomed by the *Veterinary Journal* and canine press, to obtain funds for a prolonged and earnest research into the question of disease known as "distemper" in the dog. Numerous attempts have been made in the past both by medical and veterinary scientists to discover the causal organism of distemper, with a view to finding a preventive or curative treatment which can be relied upon. Up to the present these attempts cannot be said to have met with much success, and it is suspected that the cause of distemper has its origin amongst those which are at present classified as the ultra-visible viruses. If this is proved to be the case the path towards the elucidation of certain human diseases will have been cleared of sundry obstacles to progress. An influential committee, consisting of masters of hounds and leading men in the medical and veterinary professions, have associated their names with this appeal to the public for funds, and those interested are asked to subscribe annually for a minimum period of three years. Reports are promised to subscribers at stated intervals. The appeal is likely to meet with an enthusiastic response. There is no disease of the dog which is of more importance than distemper on account of the high direct mortality and of the complications and sequelæ which follow in its train. No disease is more disappointing to treat, and the case which begins mildly is as likely as not to end with the most serious result. It has been compared with measles in the human subject, but probably epidemic influenza forms a better analogy. Acute prostation, marasmus, pneumonia, dysentery, jaundice, epilepsy, meningitis, chorea, and paralysis are only a few of the terrors which the veterinary surgeon has in his mind when called in to treat a case of distemper. Distemper is a disease in which good nursing and invalid dieting are particularly necessary. Unfortunately, the various vaccines and sera which have been tried up to the present give little better results than much-advertised quack remedies and so-called distemper cures, which extract money from the pocket of the distracted owner of a favourite dog and give him practically nothing in return. We commend the proposed research to all lovers of dogs as well as to those interested in veterinary research mainly on account of its bearing on medical problems.

STEINACH'S OPERATION.

IT must be obvious to all who have studied the literature of Steinach's operation that most writers who attempt to explain its rationale become more than a little nebulous and dependent on highly speculative hypotheses. The subject is one with an apparently irresistible appeal to elderly persons whose waning virility renders them disconsolate and fretful. A paper has recently been published by Dr. Knud Sand, of Copenhagen,[1] in which he discusses rationale, technique, and the results he has obtained in 18 cases. Vaso-ligature, he points out, is intended to cause degeneration of the spermatic epithelium, "an atrophy of the whole spermato-generative tissue, and subsequently, gradually, often perhaps after a very long time, a hypertrophy of the Leydig cells—i.e., the hormonic tissues accompanying this atrophy." The account of the operation is more lucid and informative than that of the rationale. It is not enough to perform high vasectomy, nor even to resect the vas at the level of the cauda; epididymectomy is required, and must be performed with the greatest caution. Close to the caput, several centimetres of the epididymis are exposed by small instruments, the greatest care being taken not to injure the small vessels and nerves on which the nutrition of the testicle depends. After isolation, the section of the epididymis to be removed is clamped at either end by Kocher's forceps. After resection, the free ends are firmly ligatured and then cauterised to ensure cicatricial collapse. The whole operation can be performed under local anæsthesia through a small incision. Dr. Sand classifies his cases according as they showed signs of senile decay or other diseases such as depression. His detailed records of every case suggest that the pathological changes indicated by the symptoms must have been remarkably varied. So, for the purpose of a scientific experiment, these cases were highly unsuitable, and we would refer readers to the original, which is published in English, for particulars. But it may at once be pointed out that in no case did the patients complain of any bad results. Most of them were pleased—some very much pleased—with the results. The observation period was from 3 to 21 months, and in some cases the desired effect did not occur till about half a year after the operation. Dr. Sand concludes that epididymectomy is a harmless operation which, in cases of senile decay, impotence, and depression may, in a great number of cases, prove strikingly beneficial. In one of his cases the patient was cured of a depression which had lasted for many years, and in several cases there was an increase of weight and nimbleness. Though Dr. Sand is an ardent advocate of the operation, and has had considerable experience, the method is evidently in such an early, experimental stage that its unreserved advocacy is not at present warranted.

[1] Acta Chir. Scand., Dec. 22nd, 1922.

FURTHER EXPERIENCES WITH BAYER "205."

RECENT numbers of the *Archiv. für Schiffs- und Tropen-Hygiene* have contained interesting details of further work on the new synthetic vermicide Bayer "205," showing the possibilities and limitations of the remedy. In the issue for October, 1922, Prof. W. Mollow, of Sofia, reports a case of kala-azar contracted by a Bulgarian prisoner of war in Greece. Taken prisoner in September, 1918, he was in Larissa in June, 1919, when he and several of his fellow-prisoners had to go to bed with a fever (from which the Greek population seemed also to suffer), for which they took a great deal of quinine without benefit. However, by the summer of 1920 he had recovered and reached home in that November well, but without appetite. Ten days later he again suffered from shivering and pyrexia, which again persisted in spite of quinine. In January, 1921, he noticed that his spleen was enlarging and becoming painful. In February he bled frequently from the nose and gums, and small hæmorrhagic lesions appeared on the legs. He gradually became bedridden, the spleen enlarging as the rest of his body wasted. Small painful papules appeared on his face, arms, and legs, breaking down into chronic ulcers. In July (1921 probably) he was taken into hospital, when it was noted that he was anæmic; hæmoglobin, 30 per cent.; red cells, 2,550,000; white cells, 2500; polymorphs, 75 per cent.; lymphocytes, 25 per cent. There was a trace of albuminuria; there were no casts. The long history of pyrexia uninfluenced by quinine, the notable enlargement of the spleen, the hæmorrhages, the ulcers, and the cachexia caused the disease to be regarded as kala-azar. On August 13th he was given intravenously 0·2 g. of Bayer "205," the rest of the solution at the time prepared being given to another patient who suffered no inconvenience. This patient, however, shivered 20 minutes later, and in two hours had bleedings from the nose and gums, vomiting, and bloody stools. He said he had frequently had similar attacks, though none so severe. Ultimately his heart failed, and he died at 4 A.M. It was supposed that the patient was too weak to stand the injection. Leishmania were seen in the blood from the spleen taken immediately after death. At the post-mortem, 24 hours later, they were found only in the bone marrow. The spleen was 12½ inches long and weighed 6 lb., and there was peritonitis on the posterior and anterior surfaces, with small abscesses here and there.

In the November issue Dr. Migone and Dr. T. Osuna, of Ascuncion, in Paraguay, describe the eminently successful results obtained by the use of

Bayer "205" in the curative and prophylactic treatment of the trypanosome disease, mal de caderas, among the horses on the great ranches of Paraguay. They, in the first place, insist that it is essentially necessary for every large farmer to have someone by him skilled in the use of the microscope, to be able to detect the disease in the early stages by recognising the trypanosomes in the blood. Histories are given of horses slightly affected and of horses practically dying, which were cured by the injection into their veins of 2, 3, and 4 g. in a 10 per cent. solution in normal saline at weekly intervals. The horses recovered and became fit for work. Some were even sold. They did not relapse. Two grammes is a prophylactic dose. The very carefully observed results have turned out so well that mal de caderas, which formerly decimated the ranches, may now be said to be under control, so that a new and happier future has opened before the stock breeder.

A FALLING CANCER DEATH-RATE.

So much has been written in the last 20 years or so on the progressive increase of the mortality from malignant disease that it is encouraging to come across an instance where the rate appears to have indubitably diminished. Dr. W. T. Howard has made a close study[1] of the deaths from cancer in Baltimore for which data of some kind are available since 1813. He points out that the mortality is negligible before the fourth decade of life, and is always higher in whites and females than in coloured people and males. Between 1830 and 1920 the proportion of people over 30 and over 40 increased by 55 and 75 per cent. respectively, and since 1860, and especially since 1880, the relative number of negroes has decidedly declined—facts which would to a large degree account for the large recorded increase in crude cancer mortality. Taking these factors into account, he then shows for the breast and uterus—two cases where improvements in the diagnosis of fatal cases cannot have had much influence—that the mortality has definitely fallen in the last 30 years. Rates specific for age and sex for the breast remained stationary from 1880 to 1910 and fell by 25 per cent. in 1920; for the uterus there was a substantial increase from 1880 to 1890, but since then the rate has progressively fallen and in 1920 was 40 per cent. less than in 1890. There is no evidence bearing on the question whether this decrease is due to a fall in the incidence of cancer or to improvements in its treatment; Dr. Howard inclines to the latter interpretation, which may well be correct in a city so well provided with progressive medicine. But it would be equally legitimate to propose that general improvements in habits of life have resulted in a smaller occurrence of cancer or have enabled the natural defences of the body to obliterate a larger proportion of malignant tumours in their early stages.

MENTAL DEFICIENCY AND SOCIAL FAILURE.

THE methods used for the diagnosis of mental deficiency are still more or less tentative, and all experimental work that will tend to greater accuracy is to be welcomed. The ultimate criterion of mental deficiency is, of course, "social inefficiency," but this is not diagnosable with absolute certainty until some serious social failure reveals it, and the diagnosis is then too late. The problem before the certifying officer is that of making a prognosis of future social incapacity in early life on the basis of the present condition of the person before him. Dr. J. Marius Moll's "Report on Mentally Defective Children in Transvaal Government Schools" for 1919–20—somewhat belated in appearance—deals mainly with this problem, and it would be well if all Government and municipal reports of this class could show so good a record of useful experimental work. As he points out, it was for a time thought by some that the intelligence quotient based on Binet tests was going to solve the problem, but instead of providing us with a definite borderline separating the normal from the subnormal, it only gives us a shadowy borderland area, peopled with cases that we hesitate to call feeble-minded, but who may be the most dangerous of all socially. In addition, persons of low intelligence quotient do not infrequently turn out to be social successes in their own limited sphere, while persons of relatively high intelligence quotient may behave in a manner that no society can tolerate, and be impervious to society's demands. Social failure, in fact, frequently depends upon qualities of character and temperament, and for these things satisfactory tests are lacking. A moderately low intelligence quotient, too, may go along with quite a useful amount of industrial capacity, which will fit its possessor for mechanical routine employment.

Porteus claims for his maze tests that they give a very good indication of both social and industrial efficiency. Dr. Moll has not used them sufficiently to endorse this claim, but he has himself experimented with certain tests of Healy, and of Pintner and Patterson with a view to the estimation of industrial capacity, and this report is largely a record of his results. He has endeavoured to standardise the tests, showing by graphs the degree of attainment or the length of time taken at each age—graphs derived from examination of 700 normal and 400 subnormal children. The most perfect result was obtained with Healy's pictorial completion test, but all show a more or less uniform progress from age to age. Dr. Moll is of opinion that a combination of the Binet tests (preferably in the Stanford form) with the Porteus and some of these "mechanical" tests gives a good basis for diagnosis—supplemented, of course, by allowance for physique, heredity, home conditions, and social conduct already observed. This report is a valuable contribution to the now considerable literature of the subject.

[1] American Journal of Hygiene, 1923, iii., 92.

CARBON-MONOXIDE POISONING.

THREE cases reported by R. Jaksh-Wartenhorst,[1] of Prague, illustrate some of the peculiarities of carbon-monoxide poisoning. The patients were brought to hospital at the same time, from the same dwelling-house: two women, aged 33 and 19 respectively, and a man aged 21. In all three carbon monoxide was found in the blood, rendering the diagnosis certain. The temperature was raised in all, in one case to 38° C. at first, dropping the next day and remaining subfebrile except for a rise to 38·9° on the twenty-third day. The second case had a temperature of 39·8° C. the day after admission, falling the day after to 38·2° and settling to normal on the fifth day. The third case was admitted with a temperature of 40·3° C. which dropped the next day to normal, and did not rise again. It is well known that the temperature in carbon-monoxide poisoning tends to rise when lung complications are present, but in these cases the lungs were free, and therefore it is demonstrated that the human organ reacts to this poison with a definite rise of temperature, thought by Jaksh-Wartenhorst to be due to a microscopical hæmorrhage in the region of the heat centre. The blood pressure in the first and third cases rose to 120 and 140 mm. Hg, while that of the second case sank to 90. In all the cases the blood picture showed similar changes; a slight increase in the red cells, and a marked leucocytosis (with 80 per cent., 95 per cent., and 80 per cent. polymorphonuclear cells respectively) which lasted well into convalescence. Thus, the first case had 22,000 leucocytes the day after admission, and 12,000 25 days later; the second case had 22,600 at first and 29,200 27 days later, while the third had 16,000, falling to 10,000 seven days after. Glucose was found in the urine for some hours after admission, but was absent the next day, and in only one case could alimentary glycosuria be produced four days after the onset. Apart from traces of albumin in two cases and transitory acetone in one, no urinary

[1] Medizinische Klinik, Jan. 7th, 1923.

changes were noted. The nervous symptoms were remarkable in that with the same poison very variable manifestations were observed. All three cases were deeply unconscious on admission, with stertorous breathing, and they all showed signs of severe cerebral irritation. Thus, in the first case alternating right- and left-sided convulsions occurred, lasting up to two hours, with intervals of 5 to 10 minutes. During the convulsions the respirations appeared to cease, and in the interval they were Cheyne-Stokes in rhythm. The convulsions persisted for 24 hours, and the following day a flaccid paralysis of the right arm and leg became apparent, thought by Jaksh-Wartenhorst to be due to a hæmorrhage into the internal capsule caused by weakening of the blood-vessel walls by the action of the carbon monoxide. The paralysis gradually improved until, when the patient left the hospital 31 days after admission, only a slight weakness of the right arm was present. Two months later the patient attended the hospital again, suffering with a recent gonorrhœa. He then had an intention tremor of the right arm and leg, slight ataxy, and exaggerated tendon and periosteal reflexes. The second case was characterised by trismus and opisthotonos, which came on in spasms resembling tetanus. In the intervals Cheyne-Stokes breathing was present. Retinal hæmorrhages were present in this case. The third case showed also tetanus-like convulsions, but they were unilateral, lasting 5 to 10 minutes, during which respiration stopped. Cheyne-Stokes breathing was also seen in the intervals. The convulsions ceased in 24 hours, but started again on the second day after admission, accompanied by deep coma which lasted until the third day, when the patient woke up fully conscious. It will be noted that all the symptoms were those of temporary cortical lesions, and may have been due to the action of the carbon monoxide on the vessels. All three cases recovered, and in only one were any after-effects noted—namely, the weakness of the right arm already mentioned. The treatment carried out in the three cases was the same — venesection, saline transfusions, cardiac stimulants in the form of caffeine, digitalis, and in two cases of threatened cardiac failure intravenous strophanthine.

CHARLES WHITE.[1]

THAT famous Manchester practitioner, Dr. David Lloyd Roberts, who died some two years ago, founded a lectureship in connexion with the Manchester Royal Infirmary, characteristically leaving the choice of lecturer to those who were administering the trust and the choice of subject to the lecturer, with the provision that it should be on "any subject of medical or scientific interest." Accordingly, the first Lloyd Roberts lecture was delivered by Prof. Adami, Vice-Chancellor of the University of Liverpool, who took as his subject "Charles White, of Manchester, and the Arrest of Puerperal Fever." Prof. Adami set out in his lecture the claims of Charles White, pupil and friend of the Hunters, to be one of the great obstetricians of the world, and a forerunner of Semmelweis in establishing the true nature of puerperal fever. He analysed White's teaching, and suggested that much of it is again coming to the fore after a lapse of over a century, while he proved that 70 years before Semmelweis's famous work White had indicated that "child-bed women were liable to putrid fevers" owing to the general insanitation of their environment. Prevention of self-infection in puerperal cases was White's great object, and he lived to prove by his practical success the soundness of his revolutionary theories. In the course of an analysis of the teaching of Semmelweis, comparing it with that of White, Prof. Adami is very severe upon the late Sir William Sinclair, that great Manchester obstetrician who, in eulogising Semmelweis, appears not to have made himself familiar with any of White's admirable researches. Certainly Sinclair could not have ignored the founder of St. Mary's Hospital, Manchester, if he had had any idea of his work, and lest others should pass White over in a similar way Prof. Adami has added to his lecture in its published form six chapters written by White upon Puerperal Fever.

These chapters appeared in a book which was published in London in 1773, and comprise about 100 pages, with the appendix to the second edition which was immediately called for. The book was entitled "A Treatise on the Management of Pregnant and Lying-in Women," and had a voluminous subtitle, in accordance with the style of the eighteenth century, which commences thus, "The Means of Curing but more especially of Preventing the Principal Disorders to which they are Liable," and continues, "With some New Directions concerning the Delivery of the Child and Placenta in Natural Births." White's writings, and the illustrative cases which he quotes bear out the whole of Prof. Adami's claim for him, and it is an interesting fact that the famous treatise was published almost immediately in America, and translated into German.

Charles White was in his life-time as famous in general medicine and operative surgery as in midwifery. He was the first to excise the head of the humerus, he adopted the sponge as an application in hæmorrhage, and he wrote some observations on gangrene which obtained the fame of Continental translation. He was an especial hero to the founder of the Lloyd Roberts Lectureship, so that no better subject for the inaugural discourse could have been selected.

[1] Charles White, of Manchester (1728–1813), and the Arrest of Puerperal Fever, being the Lloyd Roberts Lecture, Manchester Royal Infirmary, 1921. By J. George Adami, C.B.E., M.D., F.R.S., Vice-Chancellor of the University of Liverpool. With which are reprinted Charles White's published writings upon Puerperal Fever. The University Press of Liverpool, Ltd.; Hodder and Stoughton, Ltd., London. 1922. Pp. 142. 5s.

SIMPLE TRACHEO-BRONCHIAL ADENOPATHY.

IN a recent Paris thesis, Dr. Henri Forgeron[1] remarks that though non-tuberculous enlargement of the tracheo-bronchial glands is well known to pædiatrists, little attention has been paid to it in works of general medicine. He has, therefore, chosen this subject for his inaugural thesis, especially as no monograph has been published on this theme since the introduction of Pirquet's cuti-reaction in 1907. The thesis is based on the study of 19 autopsies on children who had died of various non-tuberculous diseases of the respiratory system, more or less considerable enlargement of the tracheo-bronchial glands being found in each case. Dr. Forgeron points out that though the enlarged glands may reach a sufficient size to compress the neighbouring organs, their action is chiefly one of irritation, and that the principal factor in this action is the accompanying periadenitis. Uncomplicated whooping-cough may occasionally give rise to tracheo-bronchial adenopathy. In such cases the interbronchial glands are the first affected, and the nervous and vascular compression caused by the enlarged glands at the root of the lungs favours the development of broncho-pneumonia. In whooping-cough complicated by broncho-pneumonia, tracheo-bronchial adenopathy is invariably present, the interbronchial and intertracheo-bronchial groups being most affected. Measles is accompanied from the first by tracheo-bronchial adenopathy. The interbronchial glands are liable to be attacked by the pulmonary complications of influenza with special intensity and may become the site of suppuration and be the indirect cause of empyema, especially of the interlobar form. In measles, whooping-cough, and influenza alike the glandular enlargement often outlasts the primary disease, and by weakening the resistance of the bronchi and lungs favour the onset of pulmonary tuberculosis. Typhoid fever affects the tracheo-bronchial glands secondarily to the pulmonary manifestations. As typhoid, like measles, often involves anergy to tuberculin, the nature of the adenopathy cannot be determined with certainty by the cuti-

[1] Thèse de Paris, 1922, No. 332.

reaction until convalescence. Acute and chronic affections of the upper respiratory tract and pharynx, especially enlarged tonsils and adenoids, are frequently associated with tracheo-bronchial adenopathy. Contrary to the prevalent opinion, the infection does not reach the mediastinal glands by the cervical lymphatic glands, but by descending bronchial infection. Both anatomical investigations and experiments on animals show that there is no connexion between the two lymphatic systems. The direct cause of simple tracheo-bronchial adenopathy is therefore invariably an infection of the lower respiratory tract. The non-tuberculous infection may rouse into activity a dormant tuberculous process and give rise to an acute glandular tuberculosis or generalised miliary tuberculosis.

THE MEDICAL STUDENT OF CENTRAL EUROPE.

WE reviewed recently a pamphlet by Mr. C. P. Blacker [1] which set out the personal experiences of himself and a group of undergraduate companions in the course of a visit to Austria, Hungary, Czecho-Slovakia, Poland, and Germany, the idea being that young Oxford should see for themselves the conditions of student life now prevailing over most of Central Europe as a result of the war. We have since received the following note from a Berlin student which provides confirmation of the letter published this week from our Berlin Correspondent. The student writes in terms which we render quite literally:—

"It is just the position of the medicals that is the unhappiest imaginable, and posterity has especially to suffer under it. After 10 terms' study, which is now to be extended to 12 terms, some few students succeed in obtaining a post as 'Praktikant' [unqualified assistant], in which, under the most favourable circumstances, they earn at present 200 to 500 marks a month, and receive free board and lodging. A number of Praktikanten do their work simply in exchange for a free midday meal, but a Praktikant may only retain his post for four months, because then a place must be found for other students. To set up in practice on their own is only possible for the richest medicals. Before the war, to provide himself with the most essential instruments, the sum of 2500 marks was needed by a medical, and for this sum one obtained a gynæcological table, an obstetric outfit, a small case of surgical instruments, a steriliser, otoscope and ophthalmoscope, and with this outfit it was possible to get along. Now the same instruments cost about 3,000,000 marks. A voluntary assistant in a clinic was offered last month, along with free board and lodging, a monthly salary of 6000 marks. A number of Berlin practitioners earn their living by serving as waiters in the evenings or as salesmen. A practitioner, an M.D. 29 years of age, is trying at this moment to obtain the position of apprentice in a Berlin business house. In banks, too, you meet with many doctors. It is a fact that in Magdeburg six doctors are in receipt of poor relief."

Our Berlin Correspondent sets out the position in terms of marks, but it can be easily understood that when the "unit" fluctuates between nothing at all and little more than nothing, no deductions can be made from the figures which will allow us to estimate with any certainty what the financial position of medical men and students in Central Europe may be at the present moment. All that we know is that life is excessively difficult for them, and as far as Germany is concerned this has been confirmed by the circular letter to the press from the Universities Committee.

THE TROPICAL DISEASES LIBRARY, LONDON.

THE first annual report of the Tropical Diseases Library, 23, Endsleigh-gardens, N.W. 1, covering the period from its foundation in February, 1921, to July 31st, 1922, has now been issued under the auspices of the Seamen's Hospital Society. The library was formed by an amalgamation of the library of the London School of Tropical Medicine with the collection of bound periodicals belonging to the Tropical Diseases Bureau. The latter are deposited on permanent loan, and in future new volumes will be transferred to the library as soon as they are bound. The report states that at the time of the amalgamation the school library contained 2825 bound volumes (monographs, reports, journals, and transactions of societies), and 2850 unbound pamphlets and reports. At present the reorganised library contains 1292 books (including the most important recent works on tropical medicine, hygiene, and parasitology, together with standard text-books and a few text-books and works of reference on general medicine) and 3457 volumes of 344 different journals and transactions of societies. A total of 122 periodicals from all over the world is regularly received. At the time of the amalgamation the binding of periodicals in the school library was many years in arrears; with the assistance of a grant of £200 made by the school committee for this purpose and for the purchase of modern text-books, 435 volumes have recently been bound. Reprints in the form of pamphlets in the possession of the library now number 2635. The reports of medical and sanitary departments of most of the British tropical colonies and possessions, and a few foreign ones, are regularly presented; there are now 173 bound volumes of these reports. Since its foundation the library has been fortunate in the matter of donations; for instance, the late Sir Patrick Manson presented numerous books and pamphlets, together with the original letters addressed to him by Sir Ronald Ross during the latter's researches on the transmission of malaria in India in 1897–98. A manuscript card-catalogue of the library is now in process of preparation. A subscription to Lewis's Library for five volumes at a time has been opened, and new books are borrowed for the use of students until the library buys copies of its own. The use made of the library has considerably increased since the amalgamation, particularly after the hours of opening were altered to 9 A.M. to 6.30 P.M. Two lists are included in the report—one of 31 volumes missing according to an old catalogue of the School of Tropical Medicine Library, the other of more than a dozen of the most important lacunæ in sets of periodicals, many of which are, of course, out of print and extremely difficult to obtain.

Sir Alfred Yarrow has given to the Royal Society a sum of £100,000, to be used at the discretion of the Council of the Society in promoting scientific research. The noble gift is an expression of his view that the prosperity of this country has been greatly hampered in the past for the want of the promotion of scientific investigation and its application to practical affairs.

WE have been notified that a change of some importance in regard to the examination for the Membership of the Royal College of Physicians in respect of candidates over the age of 40 years has been resolved. It has been the custom hitherto for the President and Censors to grant exemption from the examination in languages and in pathology to candidates over the age of 40 years, but it has now been decided that on and after October next, exemptions shall not be granted solely on the ground of age.

UNDER the auspices of the University of London, a course of three lectures on Recent Work on Inborn Errors of Metabolism will be given at the house of the Royal Society of Medicine, 1, Wimpole-street, London, W. 1, by Sir Archibald Garrod, F.R.S., at 5.30 P.M., on Feb. 28th, March 7th and 14th. At the first lecture, which will take the form of a general review, the chair will be taken by Mr. H. J. Waring, Vice-Chancellor of the University. On the same dates, at 5 P.M., a course of three public lectures on the Cultivation of Tissues in Vitro will be delivered by Mr. A. H. Drew, D.Sc., in the Physiology Theatre of University College, Gower-street, W.C.

[1] Central European Universities After the War. By C. P. Blacker, of Balliol College, Oxford. Crypt House Press, Bell-lane, Gloucester. (See THE LANCET, Jan. 13th, p. 91.)

Modern Technique in Treatment.

A Series of Special Articles, contributed by invitation, on the Treatment of Medical and Surgical Conditions.

VIII.

THE TREATMENT OF VAGINAL DISCHARGE.

BEFORE considering the treatment of vaginal discharge it is necessary, first, to recognise that the disease is not always worth treating. Occasionally, especially in the unmarried, though considerable complaint may be made, it is found that the amount of discharge is very slight, consists of clear mucus, and is only related to the menstrual period. In these trivial cases it should be pointed out that the ordinary treatment is (*a*) usually futile, and (*b*) of more trouble and inconvenience than the disease. The second point to recognise is that many cases of leucorrhœa are incurable by any means short of an operation, such as high amputation of the cervix, or even hysterectomy, and that these patients must resign themselves to a certain minimum amount of mucus which will remain in spite of any palliative methods adopted.

In all cases the treatment must be adapted to the clinical type of the disease, of which the following are distinctive.

Vaginal Discharge in Little Girls.

The difficult cases of vulvo-vaginitis in children are those in which worms, lice, pruritus and scratching, foreign bodies, and irritating urine can be excluded. Where this is possible, a bacteriological examination of the pus obtained from just inside the hymen by means of a platinum loop should be made, if necessary on more than one occasion, in order to prove the presence or absence of gonococci. Gonococcal or "idiopathic" vulvo-vaginitis is resistant unless properly treated. The vulva should be thoroughly exposed by wide separation of the child's thighs, and gently swabbed twice daily with a 10 per cent. solution of protargol. Should the discharge and soreness of the vulva not clear up after a few days' treatment, a small pledget of cotton-wool about the size of a pea is soaked in protargol and carefully introduced into the vagina by the aid of forceps. As the infection is said not to affect the upper part of the vagina in children, it should only be passed just through the hymen. If the wool pledget is small enough this treatment need not cause pain, but frequently it is only carried out with the greatest difficulty owing to the resistance and screaming of the child. Unfortunately, it is usually necessary. It is well to give a mixture containing potassium citrate, and a few grains of bromide. The child must be restrained from scratching during the night.

Vaginal Discharge in Young Virgins.

This is rarely more than clear mucus due to a functional hyperactivity of the cervical mucous glands, and chiefly evident just before or after the menstrual period. It is also occasionally a concomitant of depressed conditions of general health, fatigue, or anxiety. This form of leucorrhœa should not be treated by local measures, partly because its cause lies rather in general disturbances than local disease; and partly because, for obvious reasons, it is inadvisable to direct the attention of these patients to their genital organs. The rational line of treatment should aim at restoring the general health by suitable means proper to the individual patient. It is well, also, to reassure her that a simple mucoid discharge is of no real importance. If the discharge does not quickly disappear, or cease to cause trouble, a careful inquiry should be made again as to the character of the discharge, and, if necessary, a pelvic examination and bacteriological examination should be carried out. The fact that the patient is regarded as a "young virgin" does not necessarily exclude the possibility of gonorrhœa (as in young children), and, further, a purulent discharge in girls after the age of puberty may be a symptom of tuberculous infection of the pelvic organs.

Purulent, or Muco-purulent Discharge in Nulliparous Non-Virgins.

Though the majority of these patients are suffering from chronic gonorrhœa, it is wise to advise domestic treatment by douches and pessaries, as detailed below, before making a clinical examination. The discharge may disappear under such simple treatment, but such a rapid and easy cure is unusual, and cannot be expected if the gonococcus is present. It is necessary, therefore, after a fortnight of unavailing treatment at home, to insist on making a pelvic examination, and even if there is no bacteriological evidence, and the supporting clinical evidence is meagre or doubtful, it is well to treat the case with the thoroughness demanded by an obvious case of gonorrhœa (care must be taken to exclude the rarer condition of tuberculosis of the pelvic organs). In the absence of intrapelvic lesions, the parts to be attacked are the cervix, the urethra, and Bartholin's glands, if they are tender or palpable.

The cervical canal is the most resistant and difficult to treat. In my opinion it is advisable to commence the treatment of all chronic cases by what amounts to an operation. The patient is anæsthetised, and the urethra is dilated by metal dilators to the size of No. 9 or 10 Hegar. While the orifice is being distended by the largest dilator, a scalpel is taken and the small crypts immediately behind and to one side of the orifice, which so often exude pus on pressure, are opened up by cutting down on to the dilator as it is held in situ. The laid-open crypt is then cauterised by Paquelin's cautery, or, in default of this, by the silver-nitrate stick. The dilator is then removed and several swabs of gauze soaked with 15 per cent. protargol are passed into the dilated urethra, one after the other. The last is left there during the remainder of the operation. The cervix is then exposed, and any erosion is either thoroughly burnt by the actual cautery, or else excised. The cervical canal is then dilated (not the internal os) and its mucous membrane is treated by swabs soaked in 10 per cent. formalin. This is the most penetrating antiseptic we possess, and is better calculated to penetrate into the deep branched glands of the cervix than any other. Moreover, it is a very potent germicide in the strength of 10 per cent. At least five minutes should be spent in the repeated swabbing of the canal with formalin, care being taken that it does not spill into the unprotected vagina. If there is reason to suspect that the body of the uterus is infected on account of menorrhagia and congestive dysmenorrhœa, I dilate the internal os, curette, and introduce an 8-inch-long rubber tube, which is stitched to the cervix by catgut, and strapped to the thigh, through which Milton's fluid or eusol is injected every four hours for the next five or six days, or so long as the tube remains attached to the cervix. After the cervix has been treated, the Bartholin's glands are carefully felt for. If palpable as small, hard bodies, the size of a pea, or larger, they are pinched up by the left finger and thumb and excised by cutting down on to them.

The after-treatment consists in the daily insertion of a protargol bougie (15 per cent.) (1¼ in. × ¼ in.) into the urethra for one or two weeks, and the nightly use of a protargol pessary of the same strength. During this time the patient should use a douche of Condy's fluid. Under this treatment the discharge will frequently clear up entirely, but if it does not, it is due to infection still remaining in the cervix. This may be treated by swabbing the canal thrice a week by an antiseptic, such as 10 per cent. formalin (care being taken to protect the vagina and vulval skin

from the fluid) or "violet-green" (1 per cent.) or picric acid (saturated solution in alcohol). It is a tedious method, requires sometimes many weeks, and often fails.

A method which promises better results is the ionisation of the cervical canal by a zinc electrode passed through the external os, while the vault of the vagina contains a dilute solution of zinc sulphate. The current will effect the penetration of the ions for two or three millimetres—i.e., into the mucous glands of the cervix, wherein lurk the gonococci.

Purulent or Muco-purulent Discharge in Parous Women Associated with Lacerations of the Cervix.

If the laceration is slight it may be enough to treat the cervical canal by swabbing it three times a week with some suitable antiseptic, such as formalin, violet-green (1 per cent.), and the nightly use of a protargol pessary (15 per cent.) for two or three weeks, combined with an astringent douche twice a day. Most of these patients will react to some extent to this régime, but a recurrence of discharge on discontinuing the treatment is only too common. In case of failure, it is worth while using the cautery or treating the canal by ionisation. If, however, the laceration is deep, or bilateral, with chronic fibrosis and eversion of the lips of the cervix, the only method to ensure a cure is either the restoration of the cervical canal by the operation of trachelorrhaphy, or even amputation of the cervix. The latter operation is to be preferred in most cases owing to the chronic inflammatory process which has affected the whole substance of the cervix. There is no danger of the plastic sutures breaking down and allowing the former ectropion to recur, a cure can be guaranteed, and any further danger of more serious cervical disease can no longer threaten.

In all cases where there is a gross deformity of the cervix with exposure of the mucosa of the canal, palliative measures are likely to fail, and it is wise to represent to the patient that the discharge is only a symptom of a potentially serious disease which requires radical measures.

Purulent Discharge in Women Past the Menopause.

In the absence of carcinoma of the cervix or body, leucorrhœa in elderly women is likely to be due to a pyogenic vaginitis or endometritis. Sometimes this has been set up by the wearing of a pessary, but in others there is no obvious cause. Diagnosis is made by inspecting the vagina and cervix through a speculum. The mucous membrane, especially in the upper part, is dotted with bright-red maculæ, which are liable to ooze blood on gauze pressure. If pus can be seen exuding through the external os, it is certain that a purulent endometritis coexists, but if nothing is seen a negative diagnosis of corporeal infection cannot be inferred.

The treatment is the insertion of a protargol pessary (15 per cent.) each night for about a fortnight, and a douche of alum solution thrice daily during this period. Under this treatment a simple vaginitis will rapidly clear up, without any tendency to recur, but should it have little or no effect on the discharge it must be inferred that there is an infection of the body of the uterus, with possibly pus locked up therein (pyometra). An intermittent purulent discharge after treatment has been carried out also points to the condition of pyometra.

If, therefore, a discharge persists after treatment for a fortnight, it is proper to dilate the cervix, swab out the cavity of the uterus, and fix therein an irrigation tube as described above. Failure to provide drainage and irrigation will almost certainly lead to the recrudescence of the infection and discharge. The cavity of the senile uterus readily responds to drainage and irrigation, and it is usual for the disease to be cured finally by treatment on these lines for a week.

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Special Articles.

THE REGISTRAR-GENERAL'S STATISTICAL REVIEW.

ATTENTION has already been drawn to the convenient resumption of royal octavo in lieu of folio foolscap in the first section of the Registrar-General's Annual Report for 1921. The change is pleasant, as the former volume was doubtless bulky and difficult of handling. Whether the change will have been purchased too dearly can only be finally determined when the three parts, of which the volume now under review is the second, have all appeared. Meanwhile we must note regretfully a number of definite losses for the increasing public who study our national life records.

The present volume is handy in form and comparatively light, but this result has been produced at the expense of inconveniently narrow margins of pages, and in the more important tables at the expense of a type which is small and crowded, and which will be a severe trial to many eyes. Comparison of the old and the new tables reveals that there have been omissions and compressions, which may reduce the permanent value of the report. To this point we may need subsequently to return.

The Omission of Yearly Birth-rates.

The 83 annual reports of the Registrar-General which preceded this volume comprised the most complete statistics extant of the vital conditions of any community, displaying decade by decade in steadily increasing fullness and completeness the course of fatal disease in this country and in its constituent parts. Are we now starting on a career of restricted reporting, in which information is to be severely supervised from the point of view of its utility or necessity; forgetting that this report is a mine in which others may dig and find riches, as well as the staff of the General Register Office, and not a factory in which finished products are prepared for the edification of the public? We shall judge better when the three sections of the "Review" are before us. Meanwhile the most unfortunate omission from the present volume is that of birth-rates for the entire country for a series of years. We are not reconciled by the announcement that a further volume of the "Review" is to appear—viz., Part II.—which will contain "Civil" statistics, as distinguished from the "Medical" statistics in Part I., the volume now under consideration. The search in another volume for statistics in which births are concerned will be inconvenient and cause unnecessary labour for many medical workers in statistics. We note that in the present volume actual births for different areas are given; and there the interest of the medical worker is assumed to cease. To be consistent these births should have been omitted from the present volume; to be useful birth-rates for the chief areas should have been given. The entire conception of division of vital statistics into "medical" and "civil" appears to us to be based on some misapprehension of public needs. Many thousands of civilians rightly take deep interest in medical statistics; and medical statisticians are even more closely concerned with the collateral statistics of marriages and births, without which statistics of deaths lose much of their utility, whether for purposes of administration or research.

The Comments on the Tables.

If the separation of part of the birth statistics from the statistics of death is unfortunate, still more so is the publication of the present volume (Part I., Medical) divorced from the text illustrating and commenting on its tables. In past reports this text drew attention to the points of salient interest, and comprised also those invaluable studies of special statis-

tical problems with which each Annual Report of the Registrar-General has been enriched, and never more so than in the last 10 or 15 years. This text is to appear at a later stage, in a separate volume—a further complexity; and it is claimed that the new method aids expedition in publication, as comments on the tables necessarily must be made after the tables are completed. The present volume is issued nearly 14 months after the year with which it is concerned, an interval which does not imply expedition in publication.

Expedition of publication is rendered the more necessary, because the present volume of the "Review" comprises the statistics of infectious diseases in each administrative area of England and Wales, which for the last dozen years have been published by the Local Government Board and by the Ministry of Health not later than April of the year following that with which they were concerned. These statistics have permanent value which is not affected by delay in issue; but they have important immediate utility for medical officers of health, and this is almost destroyed by the now delayed publication.

The changes thus instituted raise the general question as to how far it is permissible unnecessarily to change the character and contents of important statistical tables which have been standardised and perfected by the experience of many years. Some changes are necessary. In the present volume some such changes are made to adapt the list of causes of death to the new International Rules. But here the changes are specified, and warning (perhaps inadequate) of risks from changes in classification is given. But apart from essential changes, alterations of standard tables, or even of their order, and contractions of fuller information previously given are to be deprecated, as rendering the stony and difficult path of the statistician unnecessarily arduous.

Excessive Price of the Report.

And this brings us to our last point. The annual reports of the Registrar-General are a national possession to be jealously guarded, and one to be made as accessible to the general (including the medical) public as is practicable. Can this object be met when the present volume is marked "price 15*s.* net"? This excessive price is given as a reason for separating the text of the report (not yet published) from the tables; a plan which is exactly comparable to the procedure of a trading company, if it published its report separate from its balance-sheet. Should not some medical Member of Parliament take up this question of price of official publications in the House of Commons? Presumably the price of this present volume is fixed by a process of "costing," to cover outlay on printing and publication. But to be consistent it should include the estimated rental value of the part of Somerset House and of the salaries of that portion of the staff of the General Register Office engaged in the tabulation and preparation of this report. If these expenditures are to be given to the public without direct payment, why exact complete payment for the printing of the report? To do so defeats the object of the compilation, in which large numbers are interested, who are now precluded from its study owing to the large price charged for it.

MEDICINE AND THE LAW.

IN THE MATTER OF DEATH CERTIFICATES.

A LETTER from Dr. W. Allingham in our present issue and another from Dr. H. A. Burridge, published in THE LANCET of Feb. 10th, call attention to the attitude of Dr. R. L. Guthrie, coroner for Poplar, when he criticised unfavourably the conduct of the house surgeon of Poplar Hospital, in connexion with the death of a woman aged 50, upon whose body he was holding an inquest. The woman, apparently on her way to the hospital, which she had before visited as an out-patient, to get a "bottle of medicine," was taken ill in an omnibus, reached the hospital, and was put to bed, dying half an hour later. The house surgeon, in order to test the accuracy of his diagnosis of a natural death, obtained the permission of the relatives to make an autopsy, and having done so, sent some of the internal organs for analysis, as indications of poisoning were present. The coroner questioned whether in the circumstances the medical man had "attended the deceased in her last illness," so as to entitle him to certify the cause of death, and held that his proper course would have been to communicate with the coroner at once. To state the law precisely upon such occasions and to apply it to the circumstances of a particular case in the matter of death certification and inquests is not always easy. Acts of Parliament have been framed with a view to the universal accurate recording of deaths and their causes and the detection of crime in the public interest, but as the law stands the attaining of this desirable object smoothly and with certainty is not possible without some degree of voluntary coöperation between the medical profession, coroners, and the public itself. That appears to us to be the situation.

There is no legal obligation upon a doctor to communicate in the first instance with the coroner. By the Coroners Act of 1887, however, the coroner is bound to hold an inquest where he is informed that a dead body is lying within his jurisdiction and there is reasonable cause to suspect that such a person has died either a violent or an unnatural death or has died a sudden death, of which the cause is unknown. On the other hand, under the Act of 1874, which governs the registration of deaths, a certificate of the cause of death of a person who has been attended "during his last illness" by a medical practitioner is to be given by him stating the cause of death "to the best of his knowledge and belief." As to what constitutes "attendance during the last illness" of a dead person, this appears to us to be a question of fact, such as any jury has to determine, when the law has been explained by the judge trying a case. Juries do not always agree and the law itself might conceivably be made more definite, but it should be noted that the words used are "during his last illness" and not merely "immediately before death" or any such phrase. It may well be possible to state the actual or immediate cause of death when a person has been brought under a doctor's observation in a moribund condition, but this does not necessarily eliminate all reason for the coroner's intervention. A child, for example, may be brought into a hospital in a dying condition by persons who have had every reason not to prevent its death. In the case at Poplar the house surgeon, in the first instance, may have justifiably formed an opinion as to the cause of his patient's death, and he may have had the right with the relative's consent to verify his opinion. When, however, the possibility of poisoning presented itself to his mind he would have been well within his rights in refusing a certificate and leaving the coroner to be informed by the relatives via the registrar—such refusal being based either on the ground that he had not attended the patient during his last illness, or because he believed that the death was in other aspects one for the coroner's consideration.

There remains the alternative of coöperation, well brought out in the evidence given before the Departmental Committee on Coroners (1909), when the late Dr. G. Bateman, called as general secretary of the Medical Defence Union, was questioned by Sir William Willcox, a member of the Committee.

Question: "In a considerable number of cases where the death is not certified and the coroner investigates the case and comes to the conclusion that no inquest is necessary, does not the medical practitioner give a certificate after the coroner has investigated the case?"

Answer: "Yes, the coroner would tell the medical man that he is justified in giving a certificate; in certain instances the medical man is doubtful about it and refers the matter

to the coroner, who hears his statement or reads his written statement, and tells him he can certify, and he does so." The evidence before the Departmental Committee touches at other points upon the subject of certification, but their report does not appear to recommend any alteration of the law which might have prevented the misunderstanding at Poplar. When the revision of the Act of 1887 takes place these points must be considered by Parliament. Meanwhile, some of them might usefully be discussed by the Medico-Legal Society, for medicine and the law are alike interested.

LUNACY IN EGYPT.

THE report [1] for 1921 of the Lunacy Division of the Ministry of the Interior, Egypt, gives full information, not only as to lunacy administration in that country, but as to the steps by which its present efficiency has been attained. The service has been in existence for 28 years, and during that comparatively short period has advanced to a position which in many respects is remarkable.

The Two Asylums.

Recent building extensions at the two asylums at Abbasîya and Khanka have increased the total number of available beds to 1841, and the actual number of patients in residence has been as high as 2364. The numbers of the staff have risen from 73 in 1895 to 588, and the annual expenditure on the service has increased twenty-fold. With each increase in the scale of treatment there has been an advance in method, amounting over the whole period to the substitution of therapeutics for mere restraint. The newest buildings are constructed on the villa system, and large numbers of the patients are usefully employed on farms. Mechanical restraint is practically never employed, and seclusion little; the number of doses of hypnotics given amounts only to three per patient per annum, and suicides and accidents are rare. There are indications in the report that the work of the attendants is well carried out. It appears that the insane Egyptian is peculiarly responsive to considerate treatment, and that the post of attendant is much sought after, even to the extent of producing 200 applications for five vacancies. These two circumstances, and the fact that ill-treatment of a patient is followed by instant dismissal with no possibility of reinstatement, have evidently combined to raise the work of the attendants to a high standard. Facilities exist for pathological work, since references are made to the Wassermann and gold-sol tests, and to the bacteriological investigation of dysentery cases, but it does not appear whether the laboratory employed is in either of the asylums, or whether, on the other hand, such specimens are sent elsewhere. As far as a report, however full, can give a true picture of life in such an institution, it is evident that the Egyptian asylums are well abreast of the times.

Types of Mental Disease.

Other circumstances connected with them result from the totally different conditions prevailing in that country as compared with those in England. A large proportion of the patients are either criminals or vagrants, and the recent increase in the admission-rate is explained by the greater activity of the police in dealing with the latter, particularly in remote districts. Owing to the exorbitant demands thus made on the existing accommodation, the average duration of treatment is only two years, and patients are frequently discharged before recovery. For this reason the recovery-rate is valueless for comparison with that of an English institution. Not only is it so for this reason, but because the types of insanity are different. The list is headed by pellagra, which accounts for one-fifth of the total admissions. This disease occurs in country districts, whereas the incidence of almost every other form is much higher in the towns. Recovery from pellagrous insanity appears to be exceptional, and experience in Egypt has thrown no important light on its ætiology, although it is stated that "cases of pellagrous manifestations are frequently seen which cannot be explained by a deficiency in quality or quantity of food." The incidence of general paralysis is much lower than in England, but its distribution among the different races is of interest in that it appears to contradict the assumption that this disease is produced by a special "neurotropic" form of syphilis. The suggestion has been made that Egyptian syphilis is less liable to be followed by general paralysis than that of other countries, since the latter disease is rare among Egyptians. But of the Maltese in Egypt, who are subject to the same variety of syphilis, no less than 18 per 1000 develop general paralysis, and of the insane Maltese treated 20 per cent. were general paralytics, as against 5 per cent. of general paralytics among the total admissions of all races. These statistics are naturally inconclusive without parallel figures as to the incidence of syphilis itself in the two races, but the strong suggestion is that other factors are concerned. The effect of such influences as addiction to alcohol or hashish, and urban as distinct from rural habits of life, is clearly shown in the statistics of other forms of insanity.

The general incidence of insanity shows a remarkable seasonal variation, rising rapidly during the excessive dry heat of early summer; the curve representing this variation corresponds closely to that of the murder-rate, which in Egypt is exceptionally high.

Legislative and Political Aspects.

At the end of this report there is printed a draft of the proposed new Lunacy Law for Egypt. Apart from variations necessitated by a different judicial system, the provisions appear almost identical with those of the English laws. It can be inferred from other parts of the report that the majority of the patients are such as would be classed in this country as paupers, and that in any case they are detained on a single certificate. Nearly 10 per cent. of these during the year under review were invalid; in some cases even the name, date, or signature were omitted. Now, however, that public confidence in asylum treatment is becoming general in Egypt, it can be presumed that a number of better-class patients will be certified on the petition of their relatives, whereas this action appears at present to be taken chiefly at the instance of the police.

This report derives particular interest from the fact that it coincides with a change in the political status of Egypt. It is believed that under the new government the British element in the public services is being eliminated. This, therefore, is a record of the degree of achievement in lunacy administration which was attained under British control, and it can be said without hesitation that the achievement is a considerable one, perhaps unparalleled in any similar State. Dr. John Warnock, to whose direction these important changes are largely due, remains superintendent of Abbasîya, the larger of the two asylums, and chief medical officer of the service.

[1] Government Press, Cairo. Price P.T.10.

BERLIN.

(FROM OUR OWN CORRESPONDENT.)

Financial Distress in Berlin Hospitals.

THE numerous private hospitals of Berlin, of which the majority belong to religious communities, have petitioned the municipal authorities for financial support, without which they will be compelled to close altogether. The St. Hedwig's (Roman Catholic) Hospital enjoys a special reputation among the public for good nursing and good food; a Jewish hospital, opened in 1913, has already been compelled to close its obstetrical ward for lack of means. Large

Lutheran establishments are the Bethania, Lazarus, and Elisabeth Hospitals. The public hospitals are either State or municipal institutions. The Charité Hospital, the oldest in Berlin, in which are the majority of the university clinics, belongs to the State. Of the municipal hospitals the largest is the Virchow Hospital, containing about 3000 beds, and opened a few years before the war; this institution, built on the pavilion system, is the size of a small town, containing a square in front of the operation building, a church, and a large administrative block. Among other municipal establishments may be mentioned the Friedrichshain Hospital, opened in 1874, which was the first institution built with separate pavilions; it was designed by the late Prof. Virchow, then a municipal councillor. All these, and the other municipal hospitals, suffer from chronic over-pressure; the number of beds has not been increased since the war, for lack of means, but the population has enormously increased—partly because all the Berlin suburbs, which formerly had administrations of their own, have been amalgamated with the city. As some of these suburbs had no adequate hospital accommodation, their inhabitants now have the right of admission to the Berlin hospitals. The closing of private hospitals, or reduction of the number of their beds, would simply mean a further overcrowding of the public hospitals. The city of Berlin is nearly bankrupt, and has no means of building new hospitals or enlarging the existing ones. The chief of the municipal medical department, Dr. Rabnow, lately stated that each new bed would mean an expense of a million marks. In September, 1922, the municipal hospitals had a deficit of 10 million marks a day, produced by the enormous rise of all expenses—heating, salaries, food, &c. The expenses of private hospitals have risen equally, and it has been moved in the municipal parliament that the request of the private hospitals for support should be granted.

German Hospital System.

The hospital system in this country differs radically from the English system. In Germany free admission is very rare; a patient who requires hospital treatment must procure a ticket of admission either from his sick-club (the majority of patients nowadays are club members) or, if poor, but not a club member, from a poor-law medical officer, or must pay a month's fees in advance. Urgent cases—accidents and contagious diseases—are, of course, admitted without any formality, but after admission inquiries are set afoot as to which club or which poor-law authority is liable to pay the expenses, or whether the patient is able to pay himself. The hospital administrations are, of course, generally very lenient in enforcing payment; a patient is never dismissed early because he cannot pay. The hospital charges in the general wards were 5 marks a day before the war, but are now 800 marks a day, including medical attendance and operation if necessary. The sums charged are not in the least sufficient to cover the actual expenses of the hospital; in public hospitals the deficit is covered either by the State or the city, and in private hospitals by the religious community or private corporation to which the hospital belongs. The low hospital charges in that way mean a gift to the sick-clubs or to private individuals admitted to the general wards. Private hospitals have single rooms for better-class patients, who are expected to pay for treatment, operations, and dressing materials in addition to their keep.

In Germany all the physicians and surgeons of the public hospitals are State or municipal officials who have to devote a large part of their time to hospital work. Their number is much smaller than in England; excepting the largest hospitals, there is usually only one chief physician and one chief surgeon for each hospital. They are aided by a number of assistants who reside in the hospital and do the routine work; they are in turn assisted by sub-assistants, young medical men in their "practica year"[1] and by students acting as dressers or clinical clerks. The salaries of these posts were rather small even before the war, but the appointments were much sought after, as hospital work offers good opportunities of thorough training, and enhances the reputations of medical men in the eyes of the public. Before the war an assistant received 250 marks a month with free board and residence; but now the figure is 100,000 marks a month with board and residence. Other students obtain, quite frequently, occupation in commercial houses. The chief physicians and surgeons received before the war 8000 marks and free residence for themselves and their families; they now receive about 300,000 marks a month. In private hospitals the remuneration is smaller, varying much in different hospitals.

Conscientious Objection to Vaccination.

The conscientious objector to vaccination has hitherto been almost unknown in this country. There were, of course, a number of more or less conscientious objectors, but they had no legal recognition, and the district medical officers could summon them before police courts and issue warrants for compulsory vaccination of children. Some time ago Prof. Grotjahn, a socialist member of the Reichstag, and professor of social hygiene at the University of Berlin, suggested in Parliament that the vaccination law should be amended and a conscience clause inserted. In an article in the *Deutsche Medicinische Wochenschrift* he admitted that small-pox rapidly decreased in the army when compulsory vaccination was introduced in 1834, whilst it continued to be epidemic in the civil population, among whom vaccination became compulsory only in 1874. Prof. Grotjahn is of opinion that vaccination alone is not responsible for the decline of small-pox, but that better hygiene and isolation of cases play their part, but he does not deny the influence of vaccination. Since other countries, employing measures less rigorous than those in force in Germany, show a similar decrease we must, according to him, revise our opinion as to the absolute value of compulsory vaccination. He insists that in England, notwithstanding the existing provision in favour of the conscientious objector, the incidence of small-pox is nearly the same as in Germany, and believes that Germany might also introduce the same provision without fear of an outbreak. By that measure, in his opinion, vaccination would probably become more popular than under the present system. His views were energetically opposed by Dr. Prinzing of Ulm, a well-known medical statistician, who showed that the mortality from small-pox has decreased everywhere, but not to the same degree as in Germany. He stated that during the war the German army in Poland lived among a population where small-pox was epidemic, and where hygienic conditions were very unsatisfactory, yet very few cases of small-pox occurred among the troops. With her long Polish frontier, Germany is not protected against the introduction of contagious diseases as England is protected by the sea. In her present financial condition Germany does not possess the means for establishment of a sufficient number of the isolation barracks whose construction was suggested by Prof. Grotjahn. Dr. Gins, chief physician of the small-pox department of the Robert Koch Institute, is also a strong advocate of compulsory vaccination. He stated that 95 per cent. of deaths from small-pox were of people above 40 years of age, whilst before the introduction of compulsory vaccination 90 per cent. of the deaths were those of children under 10 years of age. This change could, he said, only be explained by active immunisation of the whole population. Germany will probably continue to employ compulsory vaccination, although some of the existing forcible police measures may be abandoned in favour of more lenient methods.

Feb. 14th.

[1] THE LANCET, Jan. 20th, p. 155.

ROYAL COLLEGE OF SURGEONS OF ENGLAND: HUNTERIAN FESTIVAL.

MR. RUDYARD KIPLING'S ADDRESS.

A DINNER was held in the library of the College, Lincoln's Inn Fields, on Wednesday, Feb. 14th, in celebration of John Hunter's anniversary, when a large number of the Council were present to meet a distinguished group of guests, who were received by Sir Anthony Bowlby, the President, and Sir D'Arcy Power and Sir Berkeley Moynihan, the Vice-Presidents.

The toast list was short and the speaking was very good. After the usual loyal toasts, the Memory of John Hunter was received in silence, when the President proposed the health of the Visitors, making detailed allusion to many of the guests of the College. He paid a special tribute to the work of the Lord Chancellor, Lord Cave, who as chairman of the Committee on the Voluntary Hospitals had given what might be described as a second charter to the voluntary hospital system of the country. In his reply the Lord Chancellor referred with admiration and gratitude to medical men and laymen alike, who amid great and diverse difficulties and discouragements supported the voluntary system. He entered, he said, upon his duties as chairman of the Hospitals Committee with an open mind, and he had become convinced that the English system was far superior to that prevailing under the system of State hospitals met with abroad. The evidence which had been given before him compelled him to say with a grateful heart that the genius of the English-speaking race had evolved a system which was responsible for the continued health and happiness of many millions of our fellow countrymen.

Mr. Rudyard Kipling on the Mystery of Man.[1]

Mr. Rudyard Kipling proposed the health of the Hunterian Orator. He said: In the oration to which we have listened this afternoon, Sir John Bland-Sutton touched on that noble verse in Ecclesiasticus: "Honour the Physician with the honour which is due to him for the uses which ye may have of him." There is an alternative reading, which runs, "Honour a Physician before thou hast need of him." It is also seemly to honour him after that event. (Laughter.) And I have not another justification, but an excuse, for speaking in such an assembly as this. I am, by calling, a dealer in words, and words are, of course, the most powerful drug used by mankind. Not only do words infect, ergotise, narcotise, and paralyse, but they enter into and colour the minutest cells of the brain, very much as madder mixed with a stag's food at the Zoo colours the growth of the animal's antlers. Moreover, in the case of the human animal, that acquired tint, or taint, is transmissible.

A Poetical Dream.

There is a legend which has been transmitted to us from the remotest ages. It has entered into many brains and coloured not a few creeds. It is this: Once upon a time, or rather, at the very birth of time, when the Gods were so new that they had no names, and Man was still damp from the clay of the pit whence he had been digged, Man claimed that he, too, was in some sort a deity. The Gods were as just in those days as they are now. They weighed his evidence and decided that Man's claim was good—that he was, in effect, a divinity, and, as such, entitled to be freed from the trammels of mere brute instinct, to enjoy the consequence of his own acts. But the Gods sell everything at a price. Having conceded Man's claim, the legend goes that they came by stealth and stole away this godhead, with intent to hide it where Man should never find it again. But this was none so easy. If they hid it anywhere on Earth, the Gods foresaw that Man, the inveterate hunter—the father, you might say, of all hunters—would leave no stone unturned or wave unplumbed till he had recovered it. If they concealed it among themselves, they feared that Man might in the end batter his way up even to the skies. And, while they were all thus at a stand, the wisest of the Gods, who afterwards became the God Brahm, said, "I know. Give it to me!" And he closed his hand upon the tiny unstable light of Man's stolen godhead, and when that great hand opened again, the light was gone. "All is well," said Brahm. "I have hidden it where Man will never dream of looking for it. I have hidden it inside Man himself." "Yes, but whereabouts inside Man have you hidden it?" all the other Gods asked. "Ah," said Brahm, "that is my secret, and always will be unless and until Man discovers it for himself."

Man as the Hunter of Truth.

Thus, then, gentlemen, does the case stand with Man up to the present. Consider, for a moment, the pathos of the poor brute's position. You all know the common formula for him. "Born of Woman, on Woman designed to beget his life—the natural quarry of the Seven Deadly Sins, but the Altar of an inextinguishable Hope." Or, more scientifically (I regret I am not a scientific person), he might be defined as "An imperfectly denatured animal intermittently subject to the unpredictable reactions of an unlocated spiritual area." (Laughter.)

And it is just this search for this unlocated spiritual area, whether it be a growth or a survival, which has preoccupied Man from that day to this. The priest and the lawgiver have probed and fished for it all through the ages; but, more than any other, through all the ages, the leech, the medicine-man, the healer, has been hottest on its track. He has searched wherever he dared—openly or furtively—in safety or at the risk of his life. In the early days the Astrologer-Physician, as he called himself, dreamed that the secret of Man's eternal unrest was laid up in the sun, moon, and stars; and consequently, since all created things were one in essence, that an universal medicament for Man's eternal woes would be discovered upon earth. So he searched the earth and the heavens for those twin secrets, and sacrificed himself in the search as a matter of course. Later, when the embargoes on the healing art were lifted, when, at last, he was permitted to look openly into the bodies of mankind, the nature of his dreams changed for a while. He had found more wonders beneath his knife than earth or the planets had heretofore shown him. And that was barely ten generations ago. Once again, the surgeon, as he had become, renewed his search, and once again sacrificed himself in the search as his passion drove him. There is no anæsthesia so complete as man's absorption in his own job. (Hear, hear.)

The Old Quest and the New Name.

In the teeth of the outrageous, the absurd disabilities imposed on him, Man, the imperfectly denatured animal, who cannot trust the evidence of his own senses in the simplest matter of fact; whose evidence on the simplest matter is coloured by his own iniquities; Man, always the hunter, went up against the darkness that cloaked him and every act of his being, to find out what order of created being he might be. He called it scientific research. It was the old quest under a new name. But, this time, the seekers who headed it, unlike the priest and the lawyer, admitted that they knew very little. (Laughter.) Experience had taught them to be humble. For that reason their knowledge was increased. They moved forward into areas of the body, which, till then, had denied themselves to Man's hand. They were turned back, without explanation, from other areas which, as yet, would tolerate no spying. They were bewildered by mysteries which, under some new marriage of observation upon accident, or some predestined slip of the knife, resolved into—mysteries profounder still! Is it any wonder that the old dreams came back? The dream of the essential unity of all created things—the dream that some day that which men called life might be led into matter which men called dead—the boldest dream of

[1] Copyrighted by Rudyard Kipling, 1923, in the U.S.A.

all, that eventually Man might surprise the ultimate secret of his being where Brahm had hidden it, in the body of Man. And, meanwhile, their days were filled, as yours are filled, with the piteous procession of men and women begging them, as men and women beg of you daily, for leave to be allowed to live a little longer, upon whatever terms.

A Dread Art.

Is it any wonder, gentlemen of the College of Surgeons, that your calling should exact the utmost that man can give—full knowledge, exquisite judgment and skill in the highest, to be put forth, not at any self-chosen moment, but daily at the need of others? More than this. Your dread art demands the instant, impersonal vision which in one breath, one beat of the pulse, can automatically dismiss every preconceived idea and impression, and as automatically recognise, accept, and overcome whatever of new and unsuspected menace may have slid into the light beneath your steadfast hand.

But such virtue is not reached or maintained except by a life'a labour, a life's single-minded devotion. Its reward is not only the knowledge of mastery and the gratitude of the layman, which may or may not bring content. Its true reward is the dearly-prized, because unpurchasable, acknowledgment of one's fellow craftsmen.

I have the honour to-night of speaking before you, who are the masters in your craft, and I do not give you the name of the least in your long line of seekers who follow the quest Brahm set them, when I ask you to drink the health of "Sir John Bland-Sutton, a master among masters." (Loud cheers.)

Hunter and Kipling.

Sir John Bland-Sutton, in response, said that his concern was with the human body—the greatest animal in the world was man, because he possessed brains. While he had been studying the body, Mr. Kipling had been studying psychology and the psychology of animals, which was mixed up not only with the religion of Brahm, Buddhism, but with every religion in the world, and the idea of angels, and Balaam and the ass, Jonah and the whale, and Tobias and his dog all arose in some Kiplingish brain. "The Jungle Book" would go down to generations with Beauty and the Beast, Red Riding Hood's wolf, and so forth, because the lessons of Kipling were taught not as day dreams, but as the results of the study of the animals themselves, then treated beautifully, simply, and artistically by a real genius. Men of the stamp of Hunter and Kipling inspired other men. No man attained permanence unless he inspired others to imitate him, and those who, during the life-time of a great teacher, spoke well of him were often mockingly called disciples by contemporaries. But when one of those great men died some of the first to speak well of him were those who had been his detractors. Men very rarely spoke well of their friends in their presence, except in after-dinner speeches, and John Hunter was not appreciated by his contemporaries.

The following were present as guests of the President and Council of the College:—

Sir Hugh P. Allen, Mus.Doc., Sir F. W. Andrewes, Master of the Apothecaries' Society, Mr. Butler Aspinall, K.C., Master of the Barbers Company, Mr. N. G. Bennett, Dr. R. A. Bolam, Judge Ivor Bowen, Right Hon. Lord Justice Banks, Mr. R. H. Burne, Sir F. Morgan Bryant, Viscount Cave (Lord Chancellor), Sir William Church, Master of the Clothworkers' Company, Sir Frank Colyer, Lord Dawson, Rev. W. H. Draper (Master of the Temple), Master of the Drapers Company, Mr. C. H. Fagge, Sir Walter Fletcher (Secretary, Medical Research Council), Lieut.-Colonel F. E. Fremantle, M.P., Sir Archibald Garrod (Professor of Medicine, University of Oxford), Prof. G. E. Gask, Mr. F. Gill (President, Institution of Electric Engineers), Sir Rickman Godlee, Lieut.-General Sir John Goodwin, Dr. W. S. A. Griffith, Master of the Grocers Company, Mr. H. A. Gwynne, Sir W. Hale-White (President, Royal Society of Medicine), Viscount Hambleden, Mr. C. L. Hartwell, A.R.A., Sir Wilmot Herringham, Surgeon Vice-Admiral Sir Robert Hill, Mr. Montagu Hopson, Sir H. Hughes-Stanton, R.A., Sir J. Y. W. MacAlister (Secretary, Royal Society of Medicine), Sir William, Macewen (President, British Medical Association), Major-General Sir William Macpherson, Sir George Makins, Dr. John Mason, Alderman Edward C. Moore (Lord Mayor of London), Master of the Merchant Tailors Company, Air Commodore D. Munro, Sir David Murray, R.A., Mr. John Murray, Mr. P. J. Neate, Mr. H. S. Pendelbury, Mr. L. Bathe Rawling, Sir Humphry Rolleston (President, Royal College of Physicians), Master of the Salters Company, Colonel Stuart Sankey, Mr. S. G. Shattock, Mr. Justice Shearman, Sir C. S. Sherrington (President of the Royal Society), Surgeon-General W. B. Slaughter, Sir Squire Sprigge, His Honour Judge Stanger (Treasurer of Lincoln's Inn), Lord Stanmore, Mr. Sheriff J. E. K. Studd, Mr. A. T. Teniers, Prof. H. Tonks, Sir John Tweedy, Viscount Ullswater, Sir Aston Webb, P.R.A., Mr. E. H. N. Wilde, and Sir Dawson Williams.

The following Members of the Council were present:—

Sir Anthony Bowlby, in the chair, Sir D'Arcy Power, Sir Berkeley Moynihan, Sir Charters Symonds, Sir Charles Ballance, Sir John Bland-Sutton, Mr. H. J. Waring, Mr. W. G. Spencer, Mr. F. F. Burghard, Sir Herbert Waterhouse, Mr. T. H. Openshaw, Mr. Raymond Johnson, Mr. V. Warren-Low, Mr. James Sherren, Mr. E. W. Hey Groves, Sir Cuthbert Wallace, Mr. F. J. Steward, Mr. Thelwall Thomas, and Mr. R. P. Rowlands, with Mr. V. G. Plarr (librarian) and Mr. S. Forrest Cowell (secretary).

MEDICAL WOMEN'S FEDERATION.

MEDICAL WOMEN IN THE POST OFFICE.

THE Council of the Medical Women's Federation have addressed to the Postmaster-General a letter on the question of inequality of salary as between medical men and women. The letter points out that the Federation has as one of its primary objects the organisation of medical women in order that loyalty and a high standard of work may prevail amongst them, and that the principle of equal payment as between medical men and women for equal services rendered might be upheld. The letter goes on:—

The first appointment of a medical woman to a post in the General Post Office was made in 1882, and at that time there was no comparable post on the male side. In 1895 an assistant female medical officer was appointed on the same terms (£200–£300) as male assistant medical officers. This equality of payment for equal services rendered continued to exist until 1911, when an extra post was created on each side, the minimum salary for each being equal, but the maximum for the male officer was increased. A protest was made by the senior female medical officer, and a London candidate withdrew her application. A provincial graduate who was in ignorance of the inequality was appointed. In 1914 she resigned.

During the war only temporary medical officers were appointed, and these at an equal salary of eight guineas per week. In 1920 the question of permanent appointments was again raised, and the senior female medical officer, who again made a strong appeal for the abolition of inequality on sex grounds, was assured by the then chief medical officer that the work of the women medical officers in no way fell short of that of the men. In spite of this statement, in 1921 the salaries of temporary male medical officers were raised to ten guineas while the temporary female medical officers received nine guineas only. A protest was made by the female medical staff. At the present time all the assistant female medical officers in the General Post Office receive a salary on the scale of £250–£100 with bonus, as against the assistant male medical officers' £300–£500 with bonus in proportion.

In view of the inequality which now exists in the salaries of the medical staff of the General Post Office, we desire to lay stress on the fact that medical women receive exactly the same training and pass the same examinations as medical men, and also that they are capable of doing, and actually do, exactly similar work and undertake the same responsibilities as the men. We understand that the record in respect of sickness of medical women in the General Post Office service is good, and that the only retirement so far has been at the ordinary age limit. The medical women have never asked or required any extra favours or special consideration, and have readily worked longer hours whenever the necessity for this has arisen. Inequality of payment will tend to prevent the better qualified and more experienced women from offering themselves for appointment to General Post Office posts.

The letter is signed by the office bearers of the Federation, Lady Barrett, M.D. (President), Miss Frances Ivens and Dr. Mabel Ramsay (Vice-Presidents), Miss L. B. Aldrich-Blake (Hon. Treasurer), and Dr. F. M. Dickinson Berry (Hon. Secretary).

Correspondence.

"Audi alteram partem."

HOSPITAL POLICY.

HOSPITAL SAVINGS ASSOCIATION.

To the Editor of THE LANCET.

SIR,—I have just seen in your issue of Feb. 3rd a letter signed by the vice-chairman and senior physician of the West-End Hospital for Nervous Diseases relating to the scheme of the Hospital Savings Association, and while I do not wish to enter into a general discussion on the merits of the scheme, I do wish to clear away misunderstandings.

Will you therefore allow me to state shortly :—

1. The scheme involves no interference whatever with the present independent management of hospitals.

2. It is not an insurance scheme ; it does not set out to bring new classes of patients to the hospitals, but only to enlarge and organise the collection of contributions from the classes who already use the hospitals ; it leaves unimpaired the right of the hospital to decide what cases are suitable for admission to hospital treatment and the order of priority in which applicants, whether contributors or not, are admitted.

3. The only alteration in the present almoning arrangements is that the inquiry as to means by the hospital becomes unnecessary in the case of contributors, because it will have taken place before the contributor applies for hospital treatment. Hospital income limits have been defined, and every contributor who applies for hospital treatment will bring with him an authenticated statement that his income falls within them. In any case of suspicion the hospital will be afforded full opportunity of investigation through the Association.

4. The payment, or non-payment, of medical staffs is a question of hospital management, and in such questions the Association is under a pledge to the hospitals not to interfere.

5. I can see nothing that "controverts the existing principles of the voluntary system" in collecting contributions from wage-earners and using them to help the hospitals which have treated contributors. The one desire of all of us who have taken the lead in this matter is to preserve the voluntary system. The extent of the support which the scheme has already received from hospitals, employers, and representative wage-earners drawn from many trades, confirms me in the confident belief that we shall succeed.

I am, Sir, yours faithfully,

HAMBLEDEN,
Chairman, Hospital Savings Association.

3, Grosvenor-place, London, S.W., Feb. 14th, 1923.

EDUCATION IN CANCER PROBLEMS.

To the Editor of THE LANCET.

SIR,—Dr. W. H. Woglom, Associate Professor of Cancer Research in Colombia University, New York, disagrees with your editorial view that "a campaign of education cannot diminish the incidence" of cancer. Personally I think his arguments regarding the kangri basket of Kashmir and the betel nut habit of the Philippine Islands are irrefutable.

Now in this country the crucial question involved is whether or no there be pre-cancerous conditions. On this point the writings of many of your contributors are pretty clear, and a recent example is afforded by the article of Dr. Ernest Shaw in your issue of Feb. 3rd. He writes : "In view of the known fact that cancer arises in the great majority of cases in a breast already altered by inflammatory action the small operation of local removal would prevent the formation of cancer in a great many women." I think the large majority of surgeons will endorse this opinion and they consider the removal of the breast for degenerative mastitis one step in the fight against cancer. No less an authority than Sir Lenthal Cheatle has emphasised the importance of this aspect of the case, though he prefers the word "proemial" to "pre-cancerous."[1] The point remaining is whether a publicity campaign will induce women with mastitis to submit to surgery. Personally I think it will be of the greatest help.

There is another direction in which I should like to plead for a change of the editorial mind. You apparently object to the word "control" with reference to education in cancer problems, but in the dictionary by my side I find as synonyms for "control," "to restrain, govern, overpower," and that is what we must surely hope to do with cancer, and at once. Let it certainly be granted that we cannot prevent a disease until we know its causation, but do not let us give up our effort to hinder its progress. At the Royal Society of Medicine on March 13th it is proposed to hold a discussion on the Urgent Need for Education in the Control of Cancer, official notice of which has, I expect, reached you by this time, and it is because I am to take part that I urge the acceptance of the word "control." Its value lies partly in the fact that it begins with the letter "c," partly because it is in use all over America, where the Society for the Control of Cancer claims to have already done good work, and lastly because it appears to be exactly the right expression.—I am, Sir, yours faithfully,

Harley-street, W., Feb. 12th. JOSEPH E. ADAMS.

GASTRIC ULCER AND GASTRIC CANCER.

To the Editor of THE LANCET.

SIR,—Dr. A. C. Jordan, writing in your issue of Feb. 10th, states that a tense pylorus and a full pars pylorica are present in gastric ulcer and that the barium meal remains in the stomach for 50–70 hours in such cases. Surely, Dr. Jordan refers only to extensive and comparatively rare pyloric obstruction, usually due to carcinoma at the pylorus, and sometimes found also in very chronic duodenal ulcer close to that sphincter. In chronic gastric ulcer, where a penetrating lesion is present along the small curvature, or the posterior surface of the stomach, no such pyloric stenosis exists and the time of emptying shows no great delay, the meal completely passing out from 2–4 hours. In gastric ulcer, where no penetration is present, but only an incisura to indicate its site—that is to say, ulcer of a less extensive and chronic type—rapidity of emptying is the rule, often well under two hours. Even in ulcer situated at the pylorus, in the majority of patients, no delay in emptying is present. Only rarely is definite delay in emptying to be seen, and to rely upon such a sign to diagnose gastric ulcer must lead to inaccurate diagnosis in 99 per cent. of cases.

Dr. Jordan speaks also of "a distended duodenum in a state of active peristalsis in such cases, making strong efforts to overcome a stubborn duodeno-jejunal kink." A strongly contracting duodenal first stage is not dilated, the muscular contractions reducing its lumen. Also, a stomach with chronic ulcer at the upper portion of the fundus does not show hyperperistalsis of the duodenum. Hyperperistalsis is present in cases of gastric ulcer complicated by a duodenal lesion. I have seen such, and Lord Dawson reported one case about a year ago and mentioned that I had made the double diagnosis previous to operation. I have met this condition again since then. The incidence of such cases is usually given at 4 per cent. of all gastric patients operated on. This is probably a high estimate.

The duodeno-jejunal "kink" is present in every case of gastric ulcer, but also in normal cases, and its connexion with gastric ulcer is probably as remote as its pathological existence ; unless Dr. Jordan refers to the normal duodeno-jejunal flexure. Hyperperistalsis of the duodenum is usually found in duodenal ulceration. It is often associated with deformity of the bulb, either spasmodic or organic, which may

[1] Vide Brit. Med. Jour., June 3rd, 1922.

range from a small incisura, constantly present, to a complete alteration of the normal duodenal shape. I have many radiographic examples of this at hand, but in 99 per cent. gastric delay in emptying was not present, rather the reverse, and the duodenum was not dilated, but contracted, hyperperistalsis and antiperistalsis being often present. Further, a closed pylorus means an empty duodenum and in pyloric stenosis the duodenum is very difficult to observe, being empty, or very sparsely filled with the opaque meal, and in such cases the duodeno-jejunal flexure is not visible, being hidden by a dilated pars pylorica and pars media. One wonders how Dr. Jordan observes the "kink" in such cases.

In his letter he also states, "In the large intestine will be found in every case ample evidence of old stasis." Some patients with gastric ulcer do not suffer from intestinal stasis, some do, but conversely, many people who have intestinal stasis do not have gastric ulcer and the relation is far from being established on facts. It would be interesting to have the opinion of other radiologists on this point. It is generally accepted that 75 per cent. of intestinal stasis is found in women, whilst 75 per cent. of chronic gastric and duodenal ulcers are found in men. These facts cannot be reconciled with Dr. Jordan's statements.

Unless a carcinomatous ulcer is of large size, it is difficult, almost impossible, for the radiologist to distinguish it from a benign, chronic penetrating ulcer of the small curvature, and this is, of course, an important point bearing upon the surgical treatment of these lesions, as opposed to the purely medical. Again I must differ from Dr. Jordan. In carcinoma of the stomach, unless of the pylorus, there is not usually, practically never, "a big, dropped pyloric portion, the tight pyloric spasm, &c.," and even in pyloric carcinoma the pylorus may be more patent than usual, the sphincter fibres having been replaced by the growth, thus leading to rapid passage of the meal into the duodenum.

Lastly, a large proportion of carcinomata of the stomach are not based upon chronic gastric ulcers, though I quite agree that some are. The symptoms carefully investigated date often from six weeks to three months. The disease appears often in very healthy, strong individuals, irrespective of sex, and as early as 26 years of age, and cannot generally be looked upon as "the final breakdown of diseased organism . . . that has lost its capacity to resist malign influences," as Dr. Jordan asserts.

I am, Sir, yours faithfully,

GEO. VILVANDRÉ, M.R.C.S., L.R.C.P.,
Feb. 13th. Assistant Radiologist, London Hospital.

ALCOHOL AND INSANITY.

To the Editor of THE LANCET.

SIR,—In your leading article on alcohol and insanity in THE LANCET of Feb. 3rd, you say: "Thus it will be seen that the results of the mass experiment of the war have completely confirmed the view that intemperance is not . . . an important factor in the general causation of mental disease." While I agree that it is not, I must emphatically deny that any evidence adduced in your leading article proves it. It is said that although during the war alcoholism diminished, the incidence of insanity in females did not diminish but actually slightly increased. Such an observation is in itself valueless. I suppose nobody maintains that alcohol is the sole cause of mental disease, so that, granted that insanity rose while alcoholism fell, that is only significant if it be shown that at the same time other causes of insanity did not increase to a greater degree than alcoholism decreased. So far as your article indicates, no attempt was made to exclude such increased action of other factors, although the presumption must be that they did actually exist and to a very much greater degree than in pre-war days.

I am, Sir, yours faithfully,

Wimpole-street, W., Feb. 9th. STANLEY WYARD.

L'AFFAIRE SPAHLINGER.

To the Editor of THE LANCET.

SIR,—Your impartial review of some of the facts relating to this subject shows a generous attempt to solve a most perplexing problem, and will, I hope, lead to further discussion and elucidation. My personal interest was stimulated by the fact that a neighbour—an advanced case of pulmonary tuberculosis—secured some of Spahlinger's partial sera and asked me to take charge of him. With the approval of Dr. Clive Riviere, who had been looking after him, and the consent of the local practitioner, I undertook to do so. I have since made use of the opportunity, available to all medical men, to examine some of the cases treated in London in 1913–14, to look through the reports both of these and many other cases treated in Switzerland and France, and have spent three days in Geneva studying with Mr. Spahlinger details of his theory and technique and many cases now under treatment.

Briefly, the result of my investigation is this: My own patient is much better—dyspnœa practically disappeared, temperature fallen 1½°, dullness diminished, few dry crepitations where there were abundant moist râles, T.B. in sputum. Of the cases vaccinated in 1913–14, of which I saw ten (including one lupus, two glands, one bone case), one only showed evidence of recurrence. This was a case reported in 1913 as advanced pulmonary tuberculosis. He is now doing hard work as a gas-mantle maker. There is no sign of active disease in his lungs, but he has necrosis of the right superior maxilla. It should be noted in this connexion that Spahlinger has never claimed to produce more than 6–7 years' immunity by his vaccine, and that this man is living in unhealthy surroundings with his mother who is a chronic consumptive. The cases being now treated with partial sera in Geneva, most of them discharged from sanatoria as incurable, could not fail to impress the most sceptical. They describe their progress in the relief of symptoms—dyspnœa, debility, pyrexia, sweats, emaciation, &c.—as miraculous, and they certainly all look and seem remarkably well, though they are not cured.

May I then venture to offer a few criticisms on the points in your leading article in last week's issue? No statement is made in the memorandum to which you refer that the reports *already published* prove the national importance of the movement. What is claimed is that the names, actions or reports of those referred to in the memorandum support such a contention, for it must be known to you that one of the difficulties to be faced is that, though the published reports are meagre, the reports marked "private for scientific purposes only" are really the most convincing. Is no weight to be attached to the note of F.R.C.P., one of our most eminent authorities on diseases of the chest? I have had the opportunity of seeing lately some of the patients who had Spahlinger's antituberculous treatment and vaccination in 1913–14. Six years back they were affected with extensive tuberculous lesions, some of them with cavities. Since the end of 1914 these patients have had no treatment whatever. Re-examined in 1920 they showed fibrotic change in the lung and no trace of active tuberculosis, no cough, no sputum. These patients are in perfect health and able to carry on their daily occupations. Spahlinger's vaccine treatment for tuberculosis seems most effective in completing and maintaining the antituberculous cure, as all the patients examined have had no relapse during a period of over six years.

You regard the statement that there is evidence that Spahlinger's vaccines will prevent tuberculosis as exaggeration, yet his early experiments on the prevention and cure of tuberculosis in guinea-pigs are well known and supported, and he permits me to publish the following facts on his experiments on cows. Nine Freiburg cows, which did not react to tuberculin, were vaccinated in 1916, over a period of six months. In 1917 each was inoculated in the

shoulder with a large quantity of a culture of virulent living bovine T.B. Large abscesses formed at site of injection. Both cultures and pus from abscesses killed guinea-pigs in eight to nine weeks. Abscesses gradually healed, leaving indurated skin adherent to subcutaneous tissue. 1918: Two cows killed in presence of veterinary inspector for Geneva. No evidence of tuberculosis—macroscopic, microscopic, or bacteriological—and meat allowed to be sold for food. 1919: Two more killed, same result. 1921: One more killed, same result. The other four are alive in perfect health and condition, and will be killed in turn. In 1916 also he purchased a cow which showed marked tuberculin reaction. She had a bad cough and pronounced wasting. She was vaccinated and is now free from cough and a fine healthy looking cow.

What is to be done? Independent investigation of clinical cases in England and Switzerland would be welcomed by Mr. Spahlinger and everyone acquainted with the facts—but investigations in research laboratories are impossible at present, as there is no supply of the complete serum, and no partial serum has been found effectual in protecting animals so susceptible to tuberculosis as guinea-pigs. Mr. Spahlinger and his family have given all they have and can do no more. Much of the work, such as the immunisation of horses has been relinquished, and unless financial help is forthcoming he will abandon the work.

Must we wait for bacteriological demonstration, or can we fairly claim that the impressive, positive, clinical evidence already available is sufficient justification for asking for financial help in England, are questions, therefore, on which the medical men interested will anxiously await your opinion and guidance.—I am, Sir, yours faithfully,

H. S. WANSBROUGH JONES, M.B., B.Sc.

Stede Court, Biddenden, Kent, Feb. 17th, 1923.

VACCINE TREATMENT IN PERNICIOUS ANÆMIA.

To the Editor of THE LANCET.

SIR,—Dr. P. N. Panton, Dr. A. G. Maitland-Jones, and Dr. G. Riddoch, in their analysis of 117 cases of pernicious anæmia, which appeared in THE LANCET of Feb. 10th, "take the strongest possible exception" to our recommendation to use autogenous vaccines in the treatment of the disease. They give no reason for this beyond stating that they "fail to find any justification for such a procedure." If they had read a lecture published by one of us in your issue of Jan. 20th they would have discovered the justification. Briefly stated, it is as follows. In a series of 14 cases of pernicious anæmia and subacute combined degeneration of the spinal cord the *Streptococcus longus* has been isolated in every instance from the duodenal contents, obtained through an Einhorn tube with the strictest precautions to void contamination. In the more recent cases, in which the question has been specially studied, the streptococcus has been found by Dr. F. A. Knott to be hæmolytic. Similar investigations on the duodenal contents of four normal individuals and 51 patients suffering from various disorders, excluding pernicious anæmia, have shown the presence of streptococci in six instances only, and in these the streptococcus was not hæmolytic. The difference is not simply due to the achlorhydria, which was present in all the anæmic cases, as achlorhydria was also present in seven of the others, and in these no streptococci were found. The striking contrast between the 100 per cent. cases of pernicious anæmia and the 11 per cent. other cases with streptococci in their duodenal contents is at least suggestive that a streptococcal infection of the intestines may lead to the production of hæmolytic and neurotoxic poisons, the absorption of which gives rise to the anæmia and spinal degeneration respectively.

There is thus a more solid experimental foundation for the use of a vaccine prepared from the patient's own duodenal streptococcus than for any of the other methods of treatment mentioned by Dr. Panton and his colleagues, with the exception of the use of large doses of hydrochloric acid, which they admit seems "worthy of trial." Too short a time has passed to be able to state definitely whether the vaccine treatment is of real value. But we can say without hesitation that it has never done harm, and our impression is that it has proved of material advantage when combined with the removal of oral sepsis and the use of hydrochloric acid in large doses in an attempt to overcome the underlying infection, whilst the use of arsenic and, in spite of the doubts of Dr. Panton and his colleagues, repeated transfusions have helped to relieve the anæmia which results from the infection.

In a disease like pernicious anæmia, which according to Drs. Panton, Maitland-Jones, and Riddoch is almost invariably fatal, is it not worth while giving every method of treatment which is based on reasonable grounds a fair trial? Until they can suggest some rational alternative of proved value, their criticism appears to us to be quite unjustified.

We are, Sir, yours faithfully,

ARTHUR F. HURST.
J. R. BELL.

New Lodge Clinic, Windsor Forest, Feb. 12th, 1923.

DEATH CERTIFICATES AND THE CORONER.

To the Editor of THE LANCET.

SIR,—I read recently in the press that in a case in which a house surgeon had given, or offered to give, a death certificate, a woman having died half an hour after admission to hospital, the coroner said the attendance was not long enough to warrant a certificate. Twenty-five years ago, as house physician, I had a somewhat similar experience. The late Mr. Braxton Hicks then censured me at an inquest, at which I was not present, for giving a death certificate in the case of a child suffering from pneumonia, who was under my personal care for four hours in a special ward of the out-patient department, awaiting removal as the hospital was full. The child died next day, at home. The coroner made this pronouncement, "That one visit did not constitute a medical attendance." If one visit does not constitute a medical attendance—what does?—I am, Sir, yours faithfully,

Orsett, Essex, Feb. 12th, 1923. WALTER ALLINGHAM.

SOME CARDIAC QUESTIONS.

To the Editor of THE LANCET.

SIR,—The paper by Dr. John Cowan and Dr. J. K. Rennie on the Causes of Death in Chronic Valvular Disease of the Heart in THE LANCET of Feb. 3rd, draws attention, it appears to me, to one feature of importance in cardiac disease, but in other cases there may be a misinterpretation of post-mortem records.

In children, and in some cases of young adults, the fatal ending is due to a fresh attack of rheumatism affecting the heart, mainly the cardiac muscle. For this reason I have always maintained that it is unnecessary to restrain the activities of a child with a cardiac valvular lesion. Unless exercise is carried to the point of fatigue, which fatigue may predispose to fresh attacks of rheumatism, it seems to me that restraint may entail undue hardship on a child. Apart, however, from the recent endocarditis of rheumatism in fatal cases of chronic valvular disease, my own feeling is that Dr. Cowan and Dr. Rennie have been misled by appearances. When engaged in post-mortem work it always appeared to me that the frequently repeated statement that infective endocarditis attacks diseased rather than healthy valves is due to a partial misunderstanding of the nature of infective endocarditis. Infective endocarditis may sometimes—in fact, not very infrequently—deserve the name of a chronic disease, and lead to fibrosis of valves. The appearance of this fibrosis, when in the mitral valve, for example, is, however, quite different from that of the fibrosis due to rheumatism. The fibrosis of rheumatism is uniformly spread over the valve and chordæ tendineæ, leading eventually to

mitral stenosis, while that of infective endocarditis is irregular and causes puckering. I cannot say that my experience supports the view that infective endocarditis is anything but quite an exceptional ending in cases of chronic valvular disease.

I feel tempted to refer also to Dr. Martin Raven's paper in the same issue, in which he speaks of the disappearance of a diastolic bruit at the apex of the heart after acute rheumatism occurring in children. It is unfortunate that there should still appear to be so widespread a misunderstanding concerning the importance of this common sound. It has no connexion whatever with the presystolic murmur which may sometimes follow it. Vegetations never arise in rheumatism of a size which could produce such a sound, nor explain the disappearance of the sound by disappearing themselves.

I am, Sir, yours faithfully,

Norwich, Feb. 15th, 1923. THEODORE FISHER.

AUTO-INTOXICATION OR DEMENTIA PRÆCOX?

To the Editor of THE LANCET.

SIR,—While on duty with the U.S. Public Health Service in London during the summer of 1921 a case of apparent dementia præcox came under my observation, a report of which I hope may be of interest to your readers.

The patient had been in one of the first detachments of the U.S. Army to go to France in the spring of 1918. His service was said to have been good until the spring of 1919, when he became careless in his work and unreliable in the execution of orders. On his return to the States in the summer of 1919 with his detachment he was demobilised with a diagnosis of dementia præcox and sent to a hospital for further care and observation, expenses being paid by the Veterans' Bureau. After a stay there of eight months the diagnosis of dementia præcox was confirmed by the medical officer in the hospital, who gave a hopeless prognosis. He was taken from hospital and finally brought to England in June, 1921. He came under my observation in London in July, 1921. The physical examination was negative, save for increased knee-jerks, all other reflexes being apparently normal, no glandular enlargements or evidence of any specific infection, negative Wassermann. In conversation with him there was an apparent inability for fixed attention and connected thought. His replies to all questions were clear enough, but for one who had travelled extensively and who had done so great an amount of work requiring the utmost thought and concentration, they showed that some profound mental change had taken place. The attendant reported that he complained of recurrent headaches, while he had frequent outbursts of temper from very trivial causes. He also suffered from persistent sleeplessness. He is rather a good draughtsman. I was shown some of the sketches made during his hours of wakefulness. Figures of women with few clothes or none at all in varying states of abandon were the products of his sleepless hours. These pictures were obscene. The malady appeared to be dementia præcox and I gave a hopeless prognosis to his family, and advised exercise, cascara, and reading.

In August I met Dr. Uhrstein, of Warsaw, on his return from the United States, where he had been representing the Polish Government on an important mission. Dr. Uhrstein was formerly in the Russian Army, and is very well known on the continent as a specialist in nervous diseases and especially on account of his many papers on dementia præcox. It seemed a happy thought to tell Dr. Uhrstein of this case, and request a visit and his opinion. This was done, and he very gladly called with me on the patient. A very thorough examination by him showed nothing more than had been found in my previous visits. Dr. Uhrstein confirmed the diagnosis and advised exercise, cold baths, and a testicular extract made in the States. There was no improvement, fits of temper continued to come on from time to time, while the making of lewd pictures continued.

In September of 1921 I talked with Dr. A. S. Woodwark of the case, and he very kindly agreed to see the patient with me. At this time I had advised a nursing home, and the Veterans' Bureau at Washington had agreed to care for the patient in such an institution. After his examination, Dr. Woodwark said he would not give an opinion until he had had an opportunity of more extensive observation, but agreed with me that the patient should go into a nursing home for a time. The patient broke up this carefully matured plan by flatly refusing to go to any nursing home. More headaches, more sleepless nights, more temper, and more pictures followed. At my wits end, knowing that he had suffered for a long time from advanced intestinal stasis, to which condition I have devoted several months of close study and observation of cases before and after operation, the idea of liquid paraffin came to me, in the hope that the headaches and general condition would be improved by its regular use. A tablespoonful night and morning was ordered. This was in November, 1921. Very soon after reports of improvements began to reach me, headaches were less frequent, he slept better, he took more interest and zest in his daily exercise, and I was not sent for. In January the patient burned all of his artistic achievements, broke up his drafting table, and threw away his beautifully sharpened pencils, and began to talk of getting to work.

In February he made a visit of several weeks to the Continent, unaccompanied by his attendant. He returned in a condition like that which had preceded the use of paraffin. His family were in a hopeless state of discouragement, all apparent promise for recovery being gone. On learning that the paraffin had been discontinued during his trip, I gave it as my opinion that his present condition was a result to be expected from his failure to take the oil, and that a resumption of its use in still greater doses would be followed by an improvement such as had been seen in the previous autumn. Happily this opinion has been proved to be right; 11 months of constant use of liquid paraffin has apparently brought the patient back to his normal condition. He is doing a great deal of work requiring a very high order of mental effort, and doing it on his own initiative with no direction from anyone.

Whether this is a case of dementia præcox with its manifestations greatly increased by the absorption of intestinal toxins, or one in which the symptoms of this disease have been simulated from the consequences of chronic intestinal stasis, I will leave it to the reader to decide.—I am, Sir, yours faithfully,

BURR FERGUSON,
A.A. Surgeon.

Treasury Department, U.S. Public Health Service,
Southampton, England.

THE OPPOSITION TO PANEL PRACTICE.

To the Editor of THE LANCET.

SIR,—There is a statement in THE LANCET of Feb. 17th which ought not to go unchallenged.

"It may be admitted, however, that a certain number of insured persons do go to private practitioners and pay fees. This is due, on the one hand, *to the fact that in London there exist a certain number of non-panel doctors who, being hostile to the Act, persuade patients that they get better treatment by attendance as private patients;* and, on the other hand, to the idiosyncrasies of the patients themselves."

A very large number of patients, who from time to time come under the Act, prefer to retain the services of their own non-panel doctor. A very large number of patients leave their panel doctor and pay fees. In both these cases the patients generally refuse to go to the trouble of "making other arrangements" because of the great difficulty which is always thrown in the way of doing so. Their names are nearly always included in the list of one or other panel doctor for the convenience of obtaining certain certificates. On this account statistics are useless.

The statement, which I have italicised, is quite untrue. It imputes dishonourable acts to non-panel doctors and tends to create bad feeling. I have noted that for some time now THE LANCET has adopted an attitude which is definitely hostile to doctors who are general practitioners and not on the panel. I am, Sir, yours faithfully,

S. G. ASKEY, M.A., M.D.

Balham High-road, S.W., Feb. 19th, 1923.

*** We have not the attitude imputed to us, nor were the italicized words, which we agree were not happily chosen, meant to convey what our correspondent sees in them.—ED. L.

THE BACTERIUM PNEUMOSINTES.

To the Editor of THE LANCET.

SIR,—In connexion with the question of the filter-passing properties of organisms causing influenza, I should like to draw attention to the fact (verified continuously under all sorts of conditions by the late A. S. Leyton and myself) that macroscopic organisms can give off ultramicroscopic spores. This was proved in the case of the streptothrix group, three to six months' old cultures giving off exospores which will pass both F. and B. Chamberland candles.[1] Therefore, the fact of macroscopic organisms developing from cultures of filtered material does not imply contamination if the culture is a pure one. The morphological appearance of the *B. influenzæ*, especially the strepto-bacillary and involution forms, are in themselves suggestive of spore formation.

I am, Sir, yours faithfully,

Cambridge, Feb. 15th, 1923. HELEN G. LEYTON.

THE DISPENSING OF PRESCRIPTIONS.

To the Editor of THE LANCET.

SIR,—While interested in the leading article of your issue of Feb. 17th on substitutes or equivalents in prescriptions, I thought it would be of general interest to the readers of THE LANCET, a paper which has always been to the forefront in matters such as adulterations, &c., to know the results of an investigation recently made in this borough.

An opportunity was taken of having quite a simple prescription dispensed by chemists, and as far as we have gone with it, and another equally simple, 17 chemists being tried, six have fallen far short of accuracy. This can only point to careless dispensing. The prescription was *not* an insurance one. One looks for better results than this from the pharmacist, for the price paid for dispensing is considered to be in some degree a payment for skill, as it exceeds considerably what would be considered a reasonable profit on the cost of the ingredients. Surely, when over a third are so lax in their methods as has been stated (I have taken no account of slight discrepancies) there must be something radically wrong. At this time, when so many charges are being made against the panel doctor, it is as well that he should know what chance his patient has, or the non-panel doctor's patient has, of the medicine he prescribes being properly dispensed.—I am, Sir, yours faithfully,

G. CLARK TROTTER,

Feb. 19th, 1923. Medical Officer of Health, Islington.

POST-OPERATIVE "MANIA."

To the Editor of THE LANCET.

SIR,—Prof. G. M. Robertson has mistaken the object of my remarks. This was to call attention to a mental condition, occurring most unexpectedly after an ordinary operation, alarming both in its quick appearance and its mode of advance. Hence I did not go into the special points to which he refers. I also wished to draw attention to treatment, which need not be of the asylum order.

I am, Sir, yours faithfully,

Folkestone, Feb. 12th, 1923. W. J. TYSON.

[1] Particulars may be found in the Journal of Pathology and Bacteriology, vol. xxi.

Public Health Services.

REMEDIAL WORK FOR INSURED PATIENTS.

A CASE has been considered recently by a panel committee in which remedial work was suggested by the doctor for his patient whilst still in receipt of sickness benefit. The case was one of concussion, with loss of memory and inability to concentrate, in which after five weeks' complete rest the doctor advised the patient to occupy herself with small tasks and recommended light house duties. The approved society replied by quoting their rule "that no member is allowed to do any form of work when on the sick funds." The society regarded such action as a breach of their rules and as interference on the part of the doctor with the administration of benefits, this function belonging to the approved society alone. The panel committee referred the question to the Ministry of Health with the hope that remedial work for persons in receipt of sick benefit would be placed on a regular footing. The question is an important one, for if the administrative difficulties of approved societies can be overcome some kind of occupation for body and mind would materially help the restoration of many an insured person to working efficiency after a period of sickness. The question has been solved in the case of tuberculous insured persons who are residents in a colony such as Papworth. In such a community the supervision of the medical officers is regarded as a sufficient safeguard by certain approved societies. In ordinary cases where the insured person is treated at home the societies have no such safeguard, and they are not ready to relax their necessarily rigid rules.

Notwithstanding these difficulties it is important that the value of remedial work should be recognised. In the more arduous occupations the insured person's health and strength must be of a high order, and after acute illness it might be dangerous to put such a severe strain on the impoverished system as the full day's work would involve. The human frame cannot suddenly be called upon to endure the strain involved in the change from complete inaction to complete activity such as the occupation requires. For this reason, after a prolonged period of convalescence, the doctor recommends resumption of light work. In most cases such a recommendation is futile, for the moment the patient returns to work he must be prepared to put in a full day's heavy toil. The result may be disastrous, involving permanent damage and weakness to vital organs. If the convalescent period could be occupied by some form of remedial work, graduated in such a manner as to train the muscles and vital organs to a measure of activity short of dangerous strain, not only might the period of convalescence be shortened, but the restoration of mental balance would be accelerated by the happiness of the patient who is sick of inactivity. Furthermore, such remedial work would furnish a very practical test of the patient's capability or otherwise to follow his usual occupation.

If remedial work is possible in certain forms of sickness, such as tuberculosis, we fail to see why adequate supervision should not be possible in all acute illness. But it implies confidence between the doctor and the approved society.

AFTERMATH OF THE GUILDHALL CONFERENCE.

It is increasingly evident that the conference of the insurance medical service, held at the Guildhall on Jan. 30th and 31st, has helped to clear the air. The *Insurance Gazette* is satisfied that the hesitancy felt by some of the approved societies in taking part in the conference was not justified by the result. "Things were said by society representatives which could hardly commend themselves to the doctors, but there was a spirit of mutual forbearance, and this frank exchange of view did no harm. . . . The atmosphere soon became friendly, though this did not prevent the complaints

and criticisms of all sections being quite outspoken." The *Gazette* anticipates that a real attempt will be made to meet the points raised by the societies. The medical profession must regard with satisfaction the demonstration that there are many genuine enthusiasts on the lay side among the National Health Insurance workers, and it should be possible by real coöperation to solve many of the difficulties which now interfere with the smooth working of the Acts. As Sir Alfred Warren said in the conference: "One great augury of good is that some of them, having been firing at long range ever since the first Act came into operation, have now realised the value of the conference table." The *Gazette* declares that "it is a good start on a good road, and we offer congratulations to those responsible for it."

From the detailed reports of the conference now available it seems that there was very general feeling that the panel system is worth preserving and making more efficient, and that the suggestion of a whole-time salaried service being in any sense a better one met with scant support. The present machinery was felt to be sufficient, if properly worked, to deal with the majority of the complaints.

Obituary.

WILLIAM JAMES AITKEN QUINE, M.B., B.S. LOND., D.P.H.

Dr. Aitken Quine died in a nursing home at Plymouth on Feb. 17th after undergoing a serious operation earlier in the week. He was 35 years of age and was on the point of taking up his new appointment as port medical officer for Plymouth. A Manchester student, qualifying in 1913, he was resident at the Monsall Fever Hospital when the war broke out, and he obtained a commission as surgeon-lieutenant in the Navy. He was on H.M.S. *Calliope* in the battle of Jutland and for nearly 48 hours in sole medical charge, his superior officer having been severely wounded. After the armistice he settled at Chinley, Derbyshire, where he built up an extensive practice and was medical officer to the county venereal clinic. His early death is grievously felt.

THE LATE DR. G. A. W. SPEAR.

Mr. A. E. Mortimer Woolf writes: Dr. G. A. W. Spear, whose death you recorded in a brief notice in THE LANCET of Feb. 10th, had a personality which was the embodiment of cheeriness, combined with a thorough knowledge of his work, which he applied with the maximum of good sense. Courteous to all, kindly and considerate to rich and poor alike, it was not surprising that he was regarded as the personal friend as well as the family doctor by his patients. At the outbreak of war he joined immediately, and was for a time in command of the hospital at Shoeburyness, where he was universally beloved. If there was difficulty in getting a particular squad of men inoculated, Spear almost always succeeded in obtaining their consent. Subsequently he served in Egypt. His outlook on life, apart from his professional interests, was that of friendship. He had that uncommon knack of imparting a piece of himself to those with whom he was talking. The spirit of the man was never better shown than in the way he bore his last illness. Stricken by a painful fatal disease, his thought for others never deserted him, till his death at the early age of 47.

THE LATE MR. HUNTER TOD.

To a large gathering of the members of the Section of Otology of the Royal Society of Medicine and several personal friends Sir Charles Ballance read an appreciative notice of their late President, Mr. Hunter Tod, who died while holding the office.

"It was my privilege," he said, "to know our President well, both in his professional and private life, and I deeply mourn the loss of my friend. During the last few years he was often in my house, and on each occasion a merry freshness and happiness seemed to emanate from his presence. A visit from Hunter Tod was ever a welcome tonic, for he was one of those who 'Make undying music in the world.' He revelled in the game of life. He played it from start to finish right strenuously and with zeal and enthusiasm like a knight of the olden time. Incidentally, I may mention that his fighting instincts were often used with success to increase the prestige of our specialty; while his intellectual gifts, his wide range of clinical experience, and his skill as an operator were devoted to the science and art he loved so well. During all the long and painful illness of our President no word of complaint ever passed his lips. His courage mounted with occasion: it was of that type which never submits and never yields. Even to the last he met me with a smile."

The Services.

ROYAL ARMY MEDICAL CORPS.

Maj. and Bt. Lt.-Col. F. D. G. Howell relinquishes the temp. rank of Lt.-Col. on ceasing to be empld. as Asst. Dir. of Hygiene.

Maj. J. A. Clark is restd. to the estabt. and relinquishes the temp. rank of Lt.-Col.

The undermentioned Majs. retire on ret. pay: J. A. W. Webster and J. H. Duguid.

Temp. Capt. S. Herbert relinquishes his commn. on account of ill-health contracted on active service and retains the rank of Capt.

TERRITORIAL ARMY.

Maj. J. W. Kemp to be Lt.-Col. and to command 56th (1st London) Casualty Clearing Station.

Maj. E. L. Rowse, having attained the age limit, is retired, and is granted the rank of Lt.-Col.

Capt. W. T. D. Mart resigns his commn. and is granted the rank of Maj.

Capts. F. R. Harris and R. Henry to be Majs. (prov.).

Capt. E. H. Mayhew (late King's African Rifles) to be Lt. and relinquishes the rank of Capt.

Capts. J. Wallace, from T.A. Res., and D. P. H. Gardiner (late R.A.M.C., T.A.) to be Capts.; and Capt. P. Hickey to be Lt.

Capt. D. R. Cramb relinquishes his commn. and retains the rank of Capt.

General Hospitals: The undermentioned, having attained the age limit, are retired and retain their rank, except where otherwise stated: Lt.-Cols. P. Mitchell, J. M. Booth, R. Pratt, W. H. B. Brook, F. S. Lambert, W. S. Porter, A. J. Hall, and J. S. White; Majs. R. W. W. Henry (Bt. Lt.-Col.), F. S. Genney (granted the rank of Lt.-Col.), R. G. McKerron, G. Gibb, A. R. Galloway, C. H. Usher, D. W. Geddie, R. Sevestre, J. T. H. Davies, H. J. Blakesley, C. E. Marriot, J. S. Sloane, J. D. Slight, R. Stewart, C. B. Turner, O. H. Chapman, B. McFarland, G. Wilkinson, G. H. Pooley, and A. E. Naish; Capts. E. S. Winter (Bt. Maj.), G. J. R. Lowe (granted the rank of Maj.), J. R. Levack (granted the rank of Maj.), A. Young, J. M. P. Crombie, A. M. Stalker, J. M. Whyte, G. M. Duncan, J. Taylor, A. E. Payne, A. M. Crosfield, A. Foster, R. B. Stamford, E. L. Lilley, R. R. Young, J. W. Patrick, R. Michell, F. W. Bennett, R. H. Fagge, W. M. Holmes, E. W. Holyoak, H. Mason, A. Burgess, R. E. E. South, A. Miller, O. Giles, G. L. H. Revill, C. J. Coleman, D. E. Darbyshire, P. W. Young, J. B. Hall, W. Billington, J. A. Blayney, J. W. Walker, W. Scattety (granted the rank of Lt.-Col.), W. Gough, N. Milner, J. Broadley, G. S. Simpson (granted the rank of Maj.), W. J. N. Vincent (granted the rank of Lt.-Col.), H. J. E. H. Williams, M. Connon, J. E. Waite, and F. B. Carter.

The undermentioned relinquish their commns. and retain their rank except where otherwise stated: Majs. G. G. Turner, J. A. Coupland, G. E. Gask (granted the rank of Col.), and A. G. Yates; Capts. A. E. Barnes (granted the rank of Maj.), L. R. Braithwaite (granted the rank of Maj.), W. H. G. Ball, F. W. M. Greaves, J. B. Lockerbie, A. Richardson, H. C. Snell, H. J. Macvean, and W. H. N. White.

ROYAL AIR FORCE.

G. R. Nodwell is granted a short service commission as a Flying Officer.

INDIAN MEDICAL SERVICE.

The King has approved of the retirement of Maj.-Gen. J. B. Smith and Lt.-Col. E. C. McLeod.

Lt.-Col. P. F. Chapman to be Col., and Lt. E. Kean to be Capt.

Medical News.

UNIVERSITY OF OXFORD.—Theses submitted for the degree of Doctor of Medicine by William Seigfried Dawson, Trinity College, and David George Turner Kerr Cross, St. John's College, have been approved.

ROYAL COLLEGES OF PHYSICIANS OF LONDON AND SURGEONS OF ENGLAND.—As the result of the Final Examination held from Jan. 9th to Feb. 2nd the undermentioned candidates were approved in the subjects specified:—

Medicine.—F. G. Allan, St. Thomas's; Katharine M. Andrew and Constance E. Appleton, King's Coll.; E. W. Arndt, Ceylon and Middlesex; M. K. Barnett, Birmingham; Jessie H. Baxter, Univ. Coll.; A. Beauchamp, Birmingham; J. S. Benzecry, Univ. Coll.; Susanna M. Bernard and Margery G. Blackie, Royal Free; J. C. Bose, Baltimore; C. G. Bowen, Guy's; J. F. Brailsford, Birmingham; Enid A. Brock, Liverpool; F. Brockington, King's Coll.; Helen Bumstead, Charing Cross; J. T. Burrell, London; Viola C. Cameron, St. Mary's; R. H. Carter, London; L. Cohen, Leeds; R. S. Coldrey, St. Bart.'s; Eva D. Cook, Royal Free; S. H. Cookson and W. Dabbs, Birmingham; W. L. Dunlop, Liverpool; H. T. Edmunds, King's Coll.; D. G. M. Edwards, Univ. Coll.; H. C. Edwards, King's Coll.; L. C. J. Edwards, London; A. J. C. Eland, St. Bart.'s; G. M. Evans, St. Thomas's; Valentine F. Farr, St. Bart.'s; Margaret Findlay, Royal Free; Annie Foner, Univ. Coll.; F. W. Furniss, King's Coll.; P. C. C. Garnham, St. Bart.'s; C. E. Gautier-Smith, St. Thomas's; Lena B. Gayer, London; L. Ghabrial, King's Coll.; G. N. Golden and S. J. Golden, London; A. W. Gott and Marion Greaves, Leeds; J. R. Hamerton, St. Bart.'s; N. G. Harris, St. Thomas's; J. S. Hawes, London; Nancy W. Holloway, Univ. Coll.; D. H. Hubbs, Guy's; Audrey M. Hughes, Charing Cross; Laura M. Jacobs, St. Mary's; J. Jemson, Guy's; Hilda M. Kennedy, Univ. Coll.; E. H. Koerner, Guy's; L. P. Lockhart, St. Thomas's; Marian Lones and Kate Madders, Univ. Coll.; Edith T. Marshall, Royal Free; W. H. Marston, Birmingham; Dorothy E. Mason, St. Mary's; H. R. Matthews, St. George's; Margarethe Mautner, St. Mary's; Margaret S. Mills, Royal Free; M. Mitman, Guy's; Violet E. M. Mizen and Elspeth B. Moffat, Royal Free; W. B. R. Monteith, Univ. Coll.; J. H. Moorhouse, Liverpool; Muriel L. M. Northcote, Royal Free; Nancy B. Ockenden, Univ. Coll.; Beryl Palmer-Jones, King's Coll.; C. M. Pearce, St. Bart.'s; T. V. Pearce, St. Thomas's; J. P. Peel, Leeds; A. F. Percy, Guy's; J. W. Perkins, St. Mary's; T. H. I. Potts, Sheffield; Gertrude E. Pugmire, Liverpool; C. K. Rau, Middlesex; Dorothy M. Rees, King's Coll.; R. P. Rees, Middlesex; May Kathleen Ruddy, Charing Cross; Edna M. Sanders, King's Coll.; D. H. Sarafian, Middlesex; B. E. Schlesinger, Univ. Coll.; A. T. Schofield, Cambridge and St. Mary's; J. H. Simpkiss, Birmingham; G. Fraser Smith, Middlesex; R. W. Smith, St. George's; C. F. V. Smout, Birmingham; S. S. Suzman, Guy's; T. B. Thomas, St. Bart.'s; G. K. Thornton, St. George's; Olga F. Tregelles, St. Mary's; E. G. L. Walker, St. Thomas's; S. A. Walker, Liverpool; R. Whillis, Univ. Coll.; Ethel Whitby, King's Coll.; M. C. Wilkinson, St. Thomas's; L. A. Willmott, St. Bart.'s; Edith V. Wood, London; D. A. Woodeson, Liverpool; and T. Wooldridge, Guy's.

Surgery.—J. C. Ainsworth-Davis and D. D. Anderson, St. Bart.'s; Lucy T. Badcock, London; H. P. Baylis, Guy's; J. F. Brailsford, Birmingham; T. F. Briggs, St. Thomas's; B. Broadbent, St. Bart's; W. A. Brown, Guy's; Dorothy E. B. Buckmaster and J. T. Burrell, London; J. R. Burrows, Liverpool; J. E. Clegg, Manchester; G. K. Cooper, St. Thomas's; Florence E. Cowlin, Charing Cross; R. S. Creed, St. Thomas's; D. W. Crombie, London; A. D. Dyson, St. Thomas's; R. V. B. Emmons, St. Bart.'s; S. W. Eveson, London; R. A. Highmoor, Middlesex; D. B. Hitchings, Guy's; J. W. Hope-Simpson, St. Thomas's; E. R. Hughes, London; L. D. A. Hussey, King's Coll.; R. Jackson, Middlesex; N. A. Jery, St. Bart.'s; J. I. Kelly, Manchester; H. V. R. T. Lauder, St. Bart.'s; M. M. Lewin, St. Thomas's; L. O. Lindsay, London; P. M. Lissack, St. Thomas's; A. R. Lister, London; N. L. Lloyd, Guy's; C. A. Lupton, St. Thomas's; C. C. Mahoney, St. Mary's; L. Mather, Manchester; J. W. Newbold, Univ. Coll; M. Newfield, Charing Cross; C. Ousep, Madras; G. G. Penman, St. Thomas's; Gwendolen M. Pratt, Royal Free; Phyllis M. Rex, St. Mary's; J. A. W. Roberton, St. Bart.'s; May K. Ruddy, Charing Cross; J. Russell, St. Thomas's; J. M. Schofield, St. Mary's; H. Seelenfreund and G. D. Shaw, Guy's; H. H. Sumption, St. Mary's; H. C. Suri, London; R. G. Tame, Guy's; A. S. H. Walford, St. Thomas's; M. H. Webb-Peploe, St. Thomas's; L. E. H. Whitby and A. K. Wiggins, Middlesex; L. G. Williams, St. Thomas's; B. B. Yodh, Bombay and London; and L. S. V. Zinober, London.

Midwifery.—M. V. Abraham, Manchester; P. M. Acheson, King's Coll.; N. F. Adeney, Cambridge and St. Mary's; F. G. Allan, St. Thomas's; J. S. Alman, Berlin and Middlesex; R. S. Anderson, St. Bart.'s; C. E. Appleton, King's Coll.; O. D. Ballinger, Oxford and St. Bart.'s; A. A. Battson, St. Thomas's; A. Beauchamp, Birmingham; Susanna M. Bernard, Royal Free; A. J. Boase, St. Thomas's; E. R. Boland, Guy's; H. A. Bond, Univ. Coll.; J. C. Bose, Baltimore; R. T. Brain, London; J. A. Brew, Middlesex; E. A. Brock, Liverpool; R. Brooke, Guy's; D. Brown, Liverpool; J. W. Brown, Middlesex; S. G. Brown, London; W. A. Brown, Guy's; B. H. Burns, St. George's; J. R. Burrows, Liverpool; L. C. Butler, Royal Free; H. Cantrell, Liverpool; N. E. Chadwick, St. Bart.'s; G. D. Clarke, London; J. M. Clarke, Otago and Middlesex; L. Cohen, Leeds; B. A. Coles, Westminster; R. F. Connell, Middlesex; G. G. Cooke, Birmingham; G. J. V. Crosby, Univ. Coll.; J. A. Currie, Guy's; D. T. Davies, Cardiff; J. S. Dees, Middlesex; V. W. Dix, Cambridge and London; A. J. Dodhi, Bombay; N. B. Dreyer, St. Bart.'s; H. M. Du Buisson, King's Coll.; F. J. V. C. Ducoudre, Paris; G. Dudley, Birmingham; W. L. Dunlop, Liverpool; W. P. Edmunds, King's Coll.; G. Elliot, St. Bart.'s; R. S. Ellis, Birmingham; R. V. B. Emmons, St. Bart.'s; N. A. M. Empson, King's Coll.; C. W. Evans, Univ. Coll.; G. S. W. Evans, Cambridge and St. Bart.'s; J. A. Evans, Sheffield; S. Evans, Charing Cross; M. Farid, Birmingham; J. L. Farquharson and S. Farquharson, St. Thomas's; J. L. Faull, Guy's; M. Findlay, Royal Free; E. K. A. Firth, St. Thomas's; N. G. C. Gane, Middlesex; P. C. C. Garnham, St. Bart.'s; C. E. Gautier-Smith, St. Thomas's; E. H. Glynn, Liverpool; G. Golden, London; H. P. Goldsmith, Univ. Coll.; N. M. Goodman, London; A. Gordon, Guy's; F. M. Gore, Birmingham; S. E. Goulstine, Durham; S. A. Grant, London; P. D. Griffiths, St. Bart.'s; S. Halperin, St. Thomas's; H. E. Harris, St. Bart.'s; G. T. Henderson, Guy's; S. J. Hoffman, Middlesex; J. W. Hope-Simpson, St. Thomas's; L. G. Housden, Guy's; J. T. Ingram and G. Israelstam, London; L. M. Jacobs, St. Mary's; E. C. James, Cardiff; J. P. W. Jamie, St. Bart.'s; J. Jemson, Guy's; B. H. Jones and C. R. S. Jones, St. Thomas's; K. L. E. Kellgren, Royal Free; G. W. Kells, Toronto; M. E. P. Killard-Leavey, Guy's; S. W. M. King, Sydney and Bristol; I. Kinsler, St. Bart.'s; T. Latham, Manchester; D. E. Lawrence, St. Bart.'s; F. H. Leekam, St. Mary's; J. L. Lewthwaite, Liverpool; B. S. Llewelyn, Westminster; L. P. Lockhart, St. Thomas's; E. R. Maduram, Royal Free; T. E. Malins, St. Bart.'s; C. A. Martin, London; G. C. Millis, Guy's; M. S. Mills, Royal Free; G. O. Mitchell, M. Mitman, and P. McG. Moffatt, Guy's; B. S. Mote, Middlesex; G. Murray-Shirreff, Bristol; F. W. G. Nash, Middlesex; M. Nazmi, Univ. Coll.; I. Newton, Charing Cross; M. F. Nicholls, St. George's; F. W. Oldershaw, London; H. L. Oldershaw, St. Bart.'s; H. E. D. E. Ornstein, King's Coll.; E. D. Owen, Cardiff; G. W. V. Parry, Guy's; J. Pearce, Westminster; T. V. Pearce, St. Thomas's; J. P. Peel, Leeds; A. T. W. Powell, Guy's; B. M. Powell, Royal Free; G. E. Pugmire, Liverpool; M. A. Rana, St. Mary's; C. K. Rau, Middlesex; A. J. Reed, London; J. O. M. Rees, R. D. Reid, and R. L. Rhodes, St. Bart.'s; W. L. Roberts, Univ. Coll.; W. E. Rodgers, London; S. C. Rowbotham, Guy's; M. Rushbrooke, Birmingham; G. Sanders, Liverpool; J. Sevi, Paris and Charing Cross; C. J. L. Sharp, London; J. H. Simpkiss and C. F. V. Smout, Birmingham; A. J. Smyth, St. George's; C. R. Steel, St. Bart.'s; W. Stephenson and E. C. Summerskill, Charing Cross; H. H. D. Sutherland, St. Bart.'s; D. M. E. Thomas, St. Mary's; W. E. C. Thomas, Cardiff; K. W. Todd, London; H. S. Townsend, King's Coll.; N. C. Tughan, Univ. Coll.; C. F. Turner, Birmingham; H. Turover, Charing Cross; B. M. Upshon, Royal Free; F. C. O. Valentine, Cambridge and London; H. C. van Dort, Middlesex; D. Vaughan, Guy's; K. C. Vost, St. Mary's; M. W. Warren, Royal Free; M. Weinbren, Guy's; R. G. R. West, St. Bart.'s; J. N. Wheatley, London; E. Whitby, King's Coll.; N. L. White, Univ. Coll.; D. Williams, Westminster; G. Williams, St. Mary's; H. C. M. Williams, St. Bart.'s; R. K. Wilson and R. F. Wilson, London; M. M. E. Yate, Royal Free; and B. B. Yodh, Bombay and London.

UNIVERSITY OF BRISTOL.—At examinations recently held the following candidates were successful:—

FINAL EXAMINATION FOR DEGREES OF M.B., CH.B.

With Second-class Honours.—Francis J. Hector, Margeurite G. Hughes, Arthur J. Keevill, and Doris M. Pullen.

Part II. (*completing examination*).—Bertram A. Crook, John M. Evans, Frances M. Jones, James A. L. Robertson, Harry L. Shepherd, Hugh J. H. Spreadbury, and Frederick K. Wilson.

Part I. (*including Forensic Medicine and Toxicology*).—Sydney H. Blacker, Arthur P. Bodman, Ernest G. Bradbeer, Gilbert B. Bush, William L. Cossham, Mary F. Dalton, Frank R. Edbrooke, Norman J. England, Herbert M. Golding, William A. Gornall, John L. Griffin, Rowland C. Hatcher, Alexander G. Heron, Doris E. Joscelyne, Patrick C. Joscelyne, Edgar F. King, Arthur H. Marshall, John R. Nicholson-Lailey, Robert A. Sammons, Arthur E. Sherwell, Herbert Taylor, Robert E. Whitby, and Cecily F. Wilson.

Part I. only.—Naomi J. Bown, Helen M. Dixon, Lorna Dunn, and Prosper G. Evans.

THIRD EXAMINATION FOR DIPLOMA IN DENTAL SURGERY.

Dental Mechanics (*completing examination*).—Gilbert C. Brooks and Cyril H. Hill.

Dental Materia Medica (*completing examination*).—Ernest W. Mogg.

FINAL EXAMINATION FOR DIPLOMA IN DENTAL SURGERY.

Frank J. Farr, Herbert W. Pidgeon, Geoffrey G. Royal, Cyril G. Saxon, and Cecil R. Woods.

EXAMINATION FOR DIPLOMA IN PUBLIC HEALTH.

Zaki Khalid.

ROYAL SANITARY INSTITUTE.—An evening reception is being held at the Institute, 90, Buckingham Palace-road, London, S.W., at 8.30 P.M., on Monday, Feb. 26th, to meet the medical officers visiting this country under the auspices of the health organisation of the League of Nations.

EPSOM COLLEGE.—The Council will shortly award "France" pensions of £30 a year to medical men. Candidates must not be less than 55 years of age, and their yearly income, independent of any allowance from the College, must not exceed £100. Application should be made to the secretary, Mr. J. Bernard Lamb, 49, Bedford-square, London, W.C. 1.

LONDON HOSPITAL MEDICAL COLLEGE.—A course of three lectures on Diabetes Mellitus will be delivered by Dr. Otto F. F. Leyton on March 19th, 20th, and 21st, at 4 P.M., in the anatomical theatre of the College. The course is intended for senior students of the hospital and post-graduates.

MIDDLESEX HOSPITAL MEDICAL SOCIETY.—The annual special meeting will be held at the hospital on March 6th, at 8.15 for 8.30 P.M. Dr. J. S. Haldane, F.R.S., will deliver an address entitled The Institutes of Medicine and Surgery. After the address there will be demonstrations on radium, X ray and electro-therapeutics, electro-cardiography, and bacteriology.

ROYAL INSTITUTION.—On Feb. 27th, at 3 P.M., Sir Arthur E. Shipley will deliver the first of two lectures at the Royal Institution on Life and its Rhythms; and on March 1st Mr. Theodore Stevens begins a course of two lectures on Water Power of the Empire. The Friday evening discourse on March 2nd will be delivered by Dr. G. C. Simpson on the Water in the Atmosphere, and on March 9th by Dr. C. W. Saleeby on Sunlight and Disease.

WELSH NATIONAL SCHOOL OF MEDICINE.—It is announced that the Privy Council proposes to reconstitute the National School of Medicine a separate Constituent College of the University of Wales, to be governed, under the University, by a Council and Senate of its own, as recommended in the Report of the Royal Commission on University Education in Wales. The views of many of the bodies who at the date of the Royal Commission's Report dissented from this portion of its recommendations are believed to have undergone substantial modification, and the National School may be congratulated on its near prospect of gaining independence.

CHILD-STUDY SOCIETY.—Among the lectures and discussions to be held at the house of the Royal Sanitary Institute, 90, Buckingham Palace-road, S.W. 1, under the auspices of this society, is one on the Sun and Open-Air School, to be delivered by Prof. Leonard Hill, F.R.S., on March 1st, Sir Henry Gauvain presiding; and one on the New Discipline, to be delivered by Dr. H. Crichton Miller on March 22nd, Rev. J. Scott Lidgett presiding. The lectures are held at 6 P.M.

UNIVERSITY OF MANCHESTER: GRAHAM RESEARCH LABORATORY.—The Council of the University of Manchester have approved a scheme for the establishment of a new laboratory for research in colloids. A sum of nearly £12,000 is available towards endowment and cost of equipment of the department, and the laboratory will be known as "The Graham Research Laboratory." Mr. D. C. Henry, at present lecturer in chemistry in the University, has been appointed lecturer in colloid physics from September next and will take charge of the laboratory.

OPHTHALMIA NEONATORUM IN THE METROPOLITAN AREA.—In THE LANCET of August 5th, 1922, we set out the numbers of cases of ophthalmia neonatorum notified in the metropolitan area in the years 1919, 1920, and 1921, and in the first half of the year 1922, noting the numbers of cases admitted to St. Margaret's Hospital for ophthalmia neonatorum for the same periods. The complete figures for 1922 are now available. The number of notifications (866) shows a decrease of 210 from the 1921 figure, whereas the 213 cases admitted to hospital correspond exactly with the number admitted in the previous year.

OXFORD OPHTHALMOLOGICAL CONGRESS.—This congress will assemble at Keble College, Oxford, on the evening of July 4th, and the meeting will be held on July 5th and 6th. On July 5th a discussion on the Relationship of Dental Sepsis to Diseases of the Eye will be opened by Mr. W. Lang and Mr. W. R. Ackland. The official dinner of the congress will take place in the evening. The Doyne Memorial Lecture will be delivered on the morning of July 6th by Mr. H. M. Traquair, the subject being the Differential Characters of Scotomata and Their Interpretation. Members willing to contribute papers, pathological specimens, new operations, cases or novelties of any kind, are asked to communicate with the hon. secretary, Mr. Bernard Cridland, Salisbury House, Wolverhampton.

AN IRISH TEMPORARY POOR-LAW BILL.—On the motion of Mr. Ernest Blythe, Minister for Local Government, the Local Government (Temporary Provisions) Bill has been given a second reading in Dail Eirann. In his speech Mr. Blythe explained that the object of the Bill was to legalise the schemes already adopted in many counties without legal sanction. The Bill would expire on March 31st, 1924, and it was not intended that the existing schemes should remain in their present form even for that period. They would be altered and brought as near as possible to a standard form. Meanwhile, a comprehensive scheme of local government would be prepared, and it was hoped that it would become law long before the date fixed for the expiration of the Bill. The text of the Bill gives extensive powers to the Minister to vary and amend earlier existing schemes or schemes which may be adopted by counties in the future. In only one or two points does it appear to touch directly the interests of medical and other officers. (1) Under the Local Government (Ireland) Act of 1919, an officer of a local authority retiring under certain conditions might be granted by the local authority a pension not exceeding two-thirds of his salary and emoluments, without the authority being bound in any way by his years of service. The present Bill abolishes this right as regards the future, and as regards the amount of pension puts an officer back under the conditions laid down in the previous Superannuation Acts, by which his pension is limited by reference to his years of service. (2) The Bill gives the power to a county council to reopen the question of a pension awarded by the lessee (vanished) local authority to an officer compulsorily retired, and to have the pension fixed by the Minister. (3) The Bill provides that no person shall hold an office of profit under any local authority while he is, or within six months after he has ceased to be, a member of that or any other local authority. This interferes with the right given in certain county schemes to the medical profession of the county to nominate certain members of the county board of health, such members in some cases being employed as medical officers. With the Bill as printed is a valuable schedule setting out in full the schemes adopted in the several counties.

Parliamentary Intelligence.

NOTES ON CURRENT TOPICS.

The Reassembling of Parliament.

PARLIAMENT reassembled on Tuesday, Feb. 13th, the new session being opened by the King in person. In his speech from the Throne His Majesty, after a reference to the disturbed state of affairs on the Continent of Europe, and the efforts of the Government to secure peace in the Near East, said that reductions in public expenditure remained essential to the well-being of the State. After an assurance that unemployment and the condition of agriculture are engaging the attention of the Government, the speech went on to foreshadow legislation during the present session dealing, among other things, with the reform of local taxation, unemployment insurance benefit, housing, trade boards, industrial insurance, and rent restriction.

Dangerous Drugs and Poisons Bill.

A Bill to amend the Dangerous Drugs Act, 1920, and Section 17 of the Pharmacy Act, 1868, and to prescribe the method of calculating percentages in liquid preparations for the purpose of the Poisons and Pharmacy Act, 1908, and the Dangerous Drugs Act, 1920, was introduced by the Home Secretary in the House of Commons on Thursday, Feb. 15th. Clause 1 of the Bill amends Section 10 of the Dangerous Drugs Act, 1920, and gives power to a justice of the peace (or in Scotland a justice of the peace or the Sheriff) under certain circumstances to grant a warrant authorising any constable to enter, if need be by force, and search premises and persons found therein, if there is reasonable ground for suspecting that an offence against the Act has been committed in relation to drugs which may be found on such premises, or in the possession of such persons, and to seize and detain drugs and documents. Clause 2 amends Section 13 of the same Act and provides that each person guilty of an offence against the Act shall be liable on conviction or indictment in respect of each offence to a fine not exceeding £1000, or to penal servitude for a period not exceeding ten years, or to both such fine and penal servitude; or on summary conviction to a fine not exceeding £250, or to imprisonment with or without hard labour for a term not exceeding 12 months, or to both such fine and imprisonment. If a person attempts to commit an offence against the Act or solicits or incites another person to commit such an offence, he shall, without prejudice to any other liability, be liable on summary conviction to the

same punishment and forfeiture as if he had committed an offence under the Act. Clause 3 amends Section 17 of the Pharmacy Act, 1868, as respects sales to medical practitioners, dentists, and veterinary surgeons.

The clause reads as follows: (1) So much of Section 17 of the Pharmacy Act, 1868 (which prescribes certain regulations to be observed in the sale of poisons), as requires an entry in the book to be kept under that section to be signed by the purchaser, shall not, if the conditions mentioned in this section are fulfilled, apply where the purchaser is a registered medical practitioner, in actual practice, and the purchase is made by him for the purposes of his profession. (2) The conditions to be fulfilled for the purposes of this section are as follows: (*a*) There must have been received by the seller before the sale an order in writing signed by the purchaser stating his name and address and the name and quantity of the article to be purchased. (*b*) The seller must be reasonably satisfied that the signature affixed to the order is in fact the signature of the person purporting to sign it, and that that person is a registered medical practitioner. (*c*) The article sold, if sent by post to the purchaser, must be sent by registered post. (*d*) The seller must enter in the book, in the column assigned to the signatures of purchasers, the words "signed order" followed by the date on which the order is executed, and must preserve the order for a period of two years from the date on which the final entry in the book is made. (3) This section applies to registered dentists and registered veterinary surgeons as it applies to registered medical practitioners.

HOUSE OF COMMONS.

THURSDAY, FEB. 15TH.

Pensions Nursing Staff and Sick Leave.

VISCOUNTESS ASTOR asked the Minister of Pensions whether all grades of female temporary staff employed by the Ministry, including the nursing staff, were liable to a deduction of 12*s.* per week from their salary during sick leave, even if they were ineligible for the receipt of the maximum amount of sickness benefit or for any benefit; and, if so, whether he would consider the possibility of making deductions for sick leave equivalent only to the amount actually received in benefit.—Major TRYON: The noble lady's statement is generally true so far as temporary women staffs in grades entitled to sick leave privileges are concerned. I am not prepared to modify the deduction in individual cases where for one reason or another the rate of benefit received is less than 12*s.*; and it is clear that any attempt to make sick leave regulations conform to the circumstances of individual cases would give rise to serious administrative difficulties.

Ex-Service Men in Lunatic Asylums.

Mr. LANSBURY asked the Minister of Pensions how many ex-Service men at present being treated in mental hospitals his department decided to hand over for maintenance as pauper cases to Poor-law authorities, and in how many cases had boards of guardians accepted chargeability for such cases.—Mr. FREDERICK ROBERTS asked the Minister of Pensions whether any scheme had been devised for the Ministry of Pensions to keep these men under their charge.—Major TRYON replied: The number of ex-Service men in asylums for whom the temporary responsibility of my department under the terms of the Royal Warrants has terminated in accordance with the express provisions of those Warrants is 750. A certain number of these cases are still under consideration by Appeal Tribunals and otherwise, and the figure I have given may still be somewhat reduced. I am not in a position to give information as to any refusal by a board of guardians to accept financial responsibility for these men. That is a matter which rests between the guardians and the asylum authorities. All cases of the class in question have received the most careful and sympathetic consideration, both by the medical officers of my department and by the Appeal Tribunals, with a view, if possible, to continuing their previous benefits consistently with the provisions of the Warrants; but as I have already stated, I am not prepared to accept the suggestion that my department should be permanently responsible for these or any other ex-Service men whose disabilities are not connected with their war service.

Disabled Men and Medical Treatment.

Mr. FREDERICK ROBERTS asked the Minister of Pensions whether his attention had been drawn to the fact that in numerous cases disabled men applying for treatment, when examined by the pensions medical referee and found unfit in consequence of his pensionable disability, were instructed to receive treatment from the panel instead of from the Ministry; whether he was aware that, when this decision was given, the men, though unfit for work, did not receive any treatment allowance but had to claim upon the National Health Insurance and in many cases, being out of benefit, were forced to appeal to charitable organisations or accept parish relief; and whether, in view of the fact that the Royal Warrant distinctly laid it down that men certified as requiring treatment would get the same at the expense of the Ministry and receive the appropriate allowances, he would see that the regulation was carried out.—Major TRYON replied: The Royal Warrant permits the grant of treatment allowances only when the requirements of a definite course of treatment approved by the Ministry are certified to be such as will prevent the man from providing for the support of himself and his family. If this condition is fulfilled, treatment allowances may be, and, in fact are, granted to men receiving treatment from their panel doctors. I may, perhaps, remind the hon. Member that my right hon. friend, the Prime Minister, has this week appointed a committee to examine the existing arrangements for the grant of assistance on account of sickness, unemployment, and destitution from public funds with a view to securing the fullest coördination of administrative and executive action.

Special Diet Allowances.

Mr. BUCKLE asked the Minister of Pensions whether, until recently, it was possible for men suffering from almost any medical complaint to receive special diet allowance; whether the regulations now only permitted of these being granted in cases of tuberculosis and diabetes mellitus; that no allowance was granted where the man was already in receipt of 100 per cent. pensions or treatment allowances, and that the allowance could not extend for a period of more than 13 weeks; and, if so, on what grounds it was decided to stop special diet allowances.—Major TRYON replied: The allowance for special diet is limited to men suffering from pulmonary tuberculosis and diabetes mellitus where the circumstances justify the concession. The period of 13 weeks referred to is simply the initial period and may be extended in any case on medical recommendation.

Mr. JOHN DAVISON asked the Minister of Pensions the average number of disabled men who received special diet or allowance for this purpose during the six months ended Dec. 31st, 1922, the number of such cases during the week ending Jan. 31st, 1923, and the percentage of such cases in which disablement was certified as tuberculosis.—Major TRYON replied: The average number of men who received special diet during the last six months of 1922 was about 165, of whom nearly 95 per cent. were cases of pulmonary tuberculosis. I have not got the figures for the week ending Jan. 31st last. In addition, during the last few months an average of about 2600 pensioners suffering from pulmonary tuberculosis have been in-patients in institutions and sanatoriums where they receive, at the cost of the Ministry, any special diet that may be medically recommended.

National Insurance Payments.

Mr. SEXTON asked the Minister of Labour, as representing the Ministry of Health, the amount annually paid from all sources under the National Health Insurance Act for any year since 1920, or including 1920, and the amount disbursed in sick benefit and administration, separately.—Sir W. JOYNSON-HICKS replied: For the year 1921, as regards England and Wales, the amounts are as follows:—

Amount paid from all sources under the National Health Insurance Acts	£36,356,000
Amount disbursed for benefits, including £7,200,000 sickness benefit	21,562,000
Amount disbursed in administration	4,827,000

Departmental Committee on Administrative Gaps.

Mr. WEBB asked the Prime Minister the membership and terms of reference of the Departmental Committee to inquire into the gaps between the provision made by the Ministries of Pensions, Health, and Labour, and the possibility of preventing hardship to sufferers from such gaps.—Sir MONTAGUE BARLOW replied: This Committee will be presided over by the Parliamentary Secretary to the Ministry of Labour (Major Boyd Carpenter) and will include representatives of the Ministry of Labour, Ministry of Health, Scottish Board of Health, and Ministry of Pensions. Its terms of reference are: "To examine the existing arrangements for the grant of assistance on account of sickness, unemployment, and destitution, from public funds and from the contributory schemes of health and unemployment insurance, with a view to securing the fullest coördination of administrative and executive action."

Closing of Military and Naval Hospitals.

Commander BELLAIRS asked the Under Secretary of State for War whether it had been possible to close any military hospitals, and, if so, where, as the result of the proposal for the exchange of patients between the fighting services; and if any other hospitals were under consideration with a view to closing.—Lieut.-Colonel GUINNESS replied: The military hospital at Chatham was closed in June last and all military sick of that garrison are now treated in the naval hospital there. The question is being

kept under constant review with a view to treating the sick of the fighting services in one hospital at stations where it may be found practicable.

Commander BELLAIRS asked the First Lord of the Admiralty whether it had been found possible to close any naval hospitals, and, if so, where, as the result of the proposals for exchange of patients between the fighting services; if any other hospitals were under consideration with a view to closing; and whether the Yokohama naval hospital was still in existence.—Mr. EYRES-MONSELL replied: The only naval hospital which has been closed as the result of an exchange of patients between the fighting services is Gibraltar. At the present time it is not under consideration to close any other naval hospitals for a similar reason. Yokohama Naval Hospital is still in existence.

MONDAY, FEB. 19TH.

Carbon Monoxide Poisoning.

Major KELLEY asked the President of the Board of Trade whether he would coöperate with the Home Office in setting up an inquiry into the proportion of carbon monoxide and other deadly compounds now permitted in coal gas for domestic use; and whether he would introduce legislation to limit the proportion permitted of these compounds.—Viscount WOLMER (Parliamentary Secretary to the Board of Trade) replied: I would remind the hon. Member that a committee presided over by Sir William Pearce, then a Member of this House, considered this question less than two years ago. Their report was laid before the House, with the reference, Cmd. 1422. The recommendations of that committee are being carried out, and I am having a special examination made of the available statistics as to fatalities due to gas poisoning over a number of years.

Unhealthy Conditions at Smithfield Market.

Mr. TILLETT asked the Parliamentary Secretary to the Overseas Trade Department, as representing the Ministry of Health, whether he was aware that at Smithfield market it frequently happened that meat was piled on dirty pavements whilst awaiting loading, and that it was loaded in the carts and vans which frequently arrived in a filthy condition; and whether he would cause an inquiry to be made into the whole question of the handling and conveyance of meat at the public markets of London, in view of the great risk of disease and contamination to which it was exposed.—Colonel GIBBS replied: This matter is dealt with in the report of the Departmental Committee on Meat Inspection, published last year, and my right hon. friend proposes to make regulations giving effect to the recommendations of the committee on the subject.

An "All in" Method of Insurance.

Major BIRCHALL asked the Prime Minister whether, in the interest of economy and efficiency, he would consider the possibility of adopting an all-in method of insurance, so as to secure health, accident, hospital, unemployment, and additional old age benefits by one contribution.—Mr. BALDWIN (Chancellor of the Exchequer) replied: An inclusive scheme of this character would present enormous difficulties, administrative, political, and economic, and, apart from an appearance of simplicity, I am very doubtful whether it has much to commend it.

Inspection of Morphine Factories.

Lord ROBERT CECIL asked the Secretary of State for the Home Department what arrangements were in force for inspection of morphine factories in this country; and whether he was quite satisfied that adequate measures were taken to prevent abuses.—Mr. BRIDGEMAN replied: Morphine factories are subject to inspection by the Home Office inspectors under the Dangerous Drugs Act. Manufacturers are also required to keep detailed records and make periodical returns of their purchases of the raw material, their production of the drug, and their sales, and a licence has to be obtained for each consignment of the drugs which is exported from this country. We are doing all that is in our power to check the abuses of the drug traffic, but until full international coöperation has been secured it will be impossible to prevent them altogether.

Recruitment for the Indian Medical Service.

Sir JOHN HEWETT asked the Under Secretary of State for India what were the terms on which some 30 officers were recently recruited for the Indian Medical Service, and why these special terms had to be offered.—Earl WINTERTON replied: The terms offered in addition to the ordinary conditions of permanent service in the Indian Medical Service were a gratuity of £1000 and free return passages for officers who may wish to leave the Service at the end of five years. A similar gratuity is admissible to Royal Army Medical Corps officers after a somewhat longer period of service. The offer was necessitated by the serious shortage of European officers in the Service, resulting from a failure in the supply of candidates since the outbreak of war.

TUESDAY, FEB. 20TH.

Tuberculosis in Ex-Service Men Caused by Poison Gas.

Major PAGET asked the Minister of Pensions if, in view of so many men who were gassed during the war and who, since leaving the army had developed tuberculosis and were now unable to get pensions, he would cause an inquiry to be made into the whole subject.—Captain CRAIG (Lord of the Treasury) replied: It has always been the practice of the Ministry to give specially sympathetic consideration to cases of tuberculosis. Any evidence of gassing during service is invariably taken into account and full weight given to its possible bearing on the man's condition. My right hon. friend does not consider that any useful purpose would be served by an inquiry such as that suggested, but if my hon. and gallant friend has in mind any cases in which he considers justice has not been done, I shall be glad to inquire into them, if he will let me have particulars.

Agreement with Panel Practitioners.

Sir KINGSLEY WOOD asked the Parliamentary Secretary to the Overseas Trade Department, as representing the Ministry of Health, whether, in view of the expiration of the agreements at the end of this year with doctors on the panel lists, he was taking any steps to review the present scheme of medical benefit with a view to rendering it more efficient and economical.—Sir W. JOYNSON-HICKS replied: Yes, Sir, the existing arrangements for the medical treatment of insured persons are now being examined in detail by the Insurance Consultative Council of the Minister of Health.

The Spahlinger Treatment for Tuberculosis.

Captain WEDGWOOD BENN asked the Minister of Pensions whether his attention had been called to the Spahlinger treatment for tuberculosis; and whether it was intended to make this available for ex-Service patients.—Sir W. JOYNSON-HICKS replied: My right hon. friend, the Minister of Health, is informed that no supplies of M. Spahlinger's remedies are yet available in this country. When they become available it will be open to the medical officers responsible for the treatment of ex-Service men to utilise these remedies in the treatment of their patients if they consider it desirable.

Medical Diary.

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

SOCIETIES.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

MEETINGS OF SECTIONS.

Monday, Feb. 26th.

ODONTOLOGY: at 8 P.M.

Adjourned Discussion: Dental Sepsis as an Ætiological Factor in Disease of Other Organs.

Members of this Section are cordially invited to attend the Meeting of the *Section of Anæsthetics* announced for Friday, March 2nd.

Wednesday, Feb. 28th.

Social Evening.

Pasteur Centenary: This Social Evening will be devoted to celebrating the Centenary of the immortal Pasteur, and the President and Council hope that Fellows and their friends will make a special effort to honour the occasion by their presence.

The guests will be received by the President, Sir William Hale-White and Lady Hale-White at 8.30 P.M.

At 9 P.M. the President will deliver an Address on Pasteur in Relation to Medicine. This will be immediately followed by a short Lecture on Pasteur in Relation to Chemistry, by Prof. T. M. Lowry, C.B.E., F.R.S. (Professor of Physical Chemistry, Cambridge), and by a short illustrated Lecture on Pasteur as an Artist, by Dr. Gustave Monod.

The Library will be open and various objects of interest will be exhibited. Music, light refreshments, and smoking.

Thursday, March 1st.

OBSTETRICS AND GYNÆCOLOGY: at 8 P.M.

Specimens:

Prof. Henry Briggs: (1) Angioma of Vaginal Wall. (2) Section of Curettings.

Mr. Eardley Holland: Leio-myo-sarcoma of a Fibromyoma removed by Subtotal Hysterectomy.

Mr. A. C. Palmer: A large Secondary Mass of Leio-myo-sarcoma in the Peritoneum after Subtotal Hysterectomy for Multiple Fibroids, one of the latter being a Leio-myo-sarcoma.

Mr. J. Barris: Sarcoma of the Uterus (2 cases).

Mr. Gordon Luker: Chorion-epithelioma of the Uterus.

Paper:

Mr. Sidney Forsdike: The Treatment of Hæmorrhage at the Menopause by Radium, with a report upon 45 cases.

Friday, March 2nd.

LARYNGOLOGY: at 4.45 P.M. (Cases at 4 P.M.)
Dr. H. C. Cameron will show a series of cases with respiratory stridor due to meningeal hæmorrhage at birth.
Demonstration:
Dr. Jobson Horne: Tumours in the Inter-arytenoid Space of the Larynx.
Cases and Specimens will be shown by Dr. H. J. Banks-Davis, Mr. Musgrave Woodman, Mr. Walter Howarth, Mr. H. M. Wharry, Mr. E. D. D. Davis, and Sir James Dundas-Grant.

ANÆSTHETICS: at 8.30 P.M.
Paper:
Dr. W. J. McCardie: General Anæsthesia in Ordinary Dental Surgery.

ODONTOLOGY: Members of this Section are specially invited to attend the above meeting, and to take part in the discussion.

MEDICAL SOCIETY OF LONDON, 11, Chandos-street, Cavendish-square, W. 1.
MONDAY, Feb. 26th.—8.30 P.M., Discussion on The Various Methods of Treatment of Cancer of Tongue. Opened by Mr. James Berry, followed by Mr. Clayton-Greene, Mr. Wilfred Trotter, Mr. G. E. Gask, Mr. Gordon-Taylor, Mr. A. Edmunds, Mr. H. S. Clogg, Mr. Cecil Rowntree, and others.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ROYAL COLLEGE OF PHYSICIANS OF LONDON, Pall Mall East, S.W.
THURSDAY, March 1st.—5 P.M., Second Milroy Lecture:—Dr. W. G. Savage: Canned Foods in Relation to Health.

FELLOWSHIP OF MEDICINE POST-GRADUATE LECTURES, 1, Wimpole-street, W.
MONDAY, Feb. 26th.—5.30 P.M., Mr. Cecil Rowntree: Cancer of the Breast.
(At the Western General Infirmary, Marylebone-road, N.W.)
TUESDAY, Feb. 27th.—5 P.M., Dr. B. Myers: Intoxication (Summer Diarrhœa, &c.).
FRIDAY, March 2nd.—5 P.M., Dr. B. Myers: The Nervous Child as seen in General Practice.

UNIVERSITY OF LONDON ADVANCED LECTURES IN MEDICINE, Robert Barnes Hall, Royal Society of Medicine, 1, Wimpole-street, W.
(Course of Three Free Lectures.)
WEDNESDAY, Feb. 28th.—5.30 P.M., Sir Archibald E. Garrod: General Review of Inborn Errors of Metabolism.

UNIVERSITY COLLEGE, Gower-street, W.C.
(Course of Three Public Lectures in the Physiology Theatre.)
WEDNESDAY, Feb. 28th.—5 P.M., Mr. A. H. Drew: The Cultivation of Tissues in Vitro.

WEST END HOSPITAL FOR NERVOUS DISEASES.
The following Clinical Demonstrations will be held during the forthcoming Session in the Out-patient Department of the Hospital, 73, Welbeck-street, W. The Demonstrations are open to Practitioners and Medical Students without fee.
MONDAY, Feb. 26th.—1.30 P.M., Dr. Harry Campbell: Cerebellar Disease.
THURSDAY, March 1st.—1.30 P.M., Dr. Macnamara: Psychasthenia.
C. WORSTER-DROUGHT, M.D., Dean.

WEST LONDON POST-GRADUATE COLLEGE, West London Hospital, Hammersmith-road, W.
MONDAY, Feb. 26th.—10 A.M., Mr. MacDonald: Genito-Urinary Department. 12 noon, Mr. Simmonds: Applied Anatomy. 2 P.M., Mr. Addison: Surgical Wards.
TUESDAY.—10.30 A.M., Dr. Paterson: Demonstration of Medical Cases. 12 noon, Dr. Burrell: Chest Cases. 2.30 P.M., Mr. Tyrrell Gray: Surgical Wards.
WEDNESDAY.—11 A.M., Mr. Simson: Gynæcological Demonstration. 12 noon, Dr. Burnford: Pathological Demonstration. 2.30 P.M., Dr. R. M. Bruce: Demonstration of Fever Cases.
THURSDAY, March 1st.—10 A.M., Dr. Grainger Stewart: Neurological Department. 12 noon, Mr. Simmonds: Demonstration of Fractures. 4 P.M., Dr. Mitchell Bruce: Age Relations of Diseases of the Heart.
FRIDAY.—12 noon, Dr. Flett: Radiology. 2 P.M., Mr. Banks-Davis: Diseases of Nose, Throat and Ear. 3 P.M., Mr. Sinclair: Surgical Cases.
SATURDAY.—9 A.M., Dr. Burnford: Bacterial Therapy. 10 A.M., Dr. Saunders: Medical Diseases of Children. 10.30 A.M., Mr. Maingot: Surgical Pathology.
Daily, 10 A.M. to 6 P.M., Saturdays, 10 A.M. to 1 P.M., In-patients, Out-patients, Operations, Special Departments.

SOUTH-WEST LONDON POST-GRADUATE ASSOCIATION, St. James's Hospital, Ouseley-road, Balham, S.W.
THURSDAY, March 1st.—4.30 P.M., Mr. Macleod Yearsley: Demonstration of Aural Cases.

NATIONAL HOSPITAL FOR THE PARALYSED AND EPILEPTIC, Queen-Square, Bloomsbury, W.C. 1.
POST-GRADUATE COURSE: JAN.–MARCH, 1923.
CLINICAL LECTURES AND DEMONSTRATIONS.
MONDAY, Feb. 26th.—2 P.M., Out-patient Clinic: Dr. Hinds Howell. 3.30 P.M., X Ray Demonstration: Dr. Russell Reynolds.
TUESDAY, Feb. 27th.—2 P.M., Out-patient Clinic: Dr. Grainger Stewart. 3.30 P.M., Lecture:—Head Injuries: Mr. Armour.
THURSDAY, March 1st.—2 P.M., Out-patient Clinic: Dr. Kinnier Wilson. 3.30 P.M., Lecture:—Pituitary Disease: Dr. Gordon Holmes.
FRIDAY, March 2nd.—2 P.M., Out-patient Clinic: Dr. Gordon Holmes. 3.30 P.M., Lecture:—Labyrinthine Disease and Its Investigation: Mr. Sydney Scott.
Mr. Armour and Mr. Sargent operate at the Hospital on Tuesday and Friday mornings at 9 A.M., or at such other times as may be announced.
NEURO-PATHOLOGY.
MONDAY, Feb. 26th.—12 noon, Syphilis of the Nervous System: Dr. J. Godwin Greenfield.
N.B.—A Course of Lectures in the Anatomy and Physiology of the Nervous System will be given if there are sufficient entries for it.
The fee for the whole Course, including Anatomy and Physiology, is £12 12*s.*; but these Lectures may be taken separately for a fee of £4 4*s.* Course without Anatomy and Physiology Lectures will be £10 10*s.* Any part of the Course may be taken separately at a special fee. Special arrangements will be made for those unable to take the whole Course. Fees should be paid to the Secretary of the Hospital at the office on entering for the Course.
C. M. HINDS HOWELL, Dean of Medical School.

NATIONAL HOSPITAL FOR DISEASES OF THE HEART POST-GRADUATE COURSE, Westmoreland-street, Marylebone, W.
THURSDAY, March 1st.—5.30 P.M., Dr. R. O. Moon: Heart Diseases and Occupations.

HOSPITAL FOR SICK CHILDREN, Great Ormond-street, W.C.
THURSDAY, March 1st.—4 P.M., Mr. Higgins: Rectal Surgery.

ST. JOHN'S HOSPITAL, 49, Leicester-square, W.C.
THURSDAY, March 1st.—5 P.M., Dr. W. Griffith: The Bullous Eruptions.

MANCHESTER ROYAL INFIRMARY POST-GRADUATE LECTURES.
TUESDAY, Feb. 27th.—4.15 P.M., Dr. C. H. Melland: Some Cases of Cardiac Irregularity.
FRIDAY.—4.15 P.M., Dr. E. M. Brockbank: The Microscopical Examination of the Blood in the Diagnosis of Disease.

ST. MARY'S HOSPITALS, MANCHESTER. POST-GRADUATE LECTURE (Whitworth-street West Branch).
FRIDAY, March 2nd.—4.30 P.M., Mr. J. Morley: Appendicitis in Children.

MANCHESTER BABIES' HOSPITAL, POST-GRADUATE LECTURES, Slade-lane, Levenshulme.
SATURDAY, March 3rd.—4 P.M., Miss Harriette Chick: Recent Experimental Work on Rickets and its Application to Infants.
The lecture by Dr. N. H. Parry, announced for Saturday, Feb. 24th, has been cancelled.

SALFORD ROYAL HOSPITAL. POST-GRADUATE LECTURE.
THURSDAY, March 1st.—4.30 P.M., Dr. Higgins: The Differentiation of the Normal from the Abnormal in the Radiology of the Bones.

ROYAL INSTITUTE OF PUBLIC HEALTH, 37, Russell-square, W.C.
WEDNESDAY, Feb. 28th.—4 P.M., Mr. E. R. Townley Clarkson: Notes on Venereal Clinics: Their Function and Organisation.

Appointments.

CHAMBERS, E. R., F.R.C.S.Edin., D.O.M.S.Lond., M.R.C.S., L.R.C.P.Lond., has been appointed Ophthalmic Surgeon, Bristol Royal Infirmary.
LEWIS, F., M.R.C.S., L.R.C.P., House Surgeon, Durham County Hospital.
NELSON, T. S., M.R.C.P. Lond., M.A., B.M., B.Ch. Oxf., Assistant Physician to the Brompton Hospital for Consumption and Diseases of the Chest.
STALLARD, R. E. W., (Mrs.), M.D., B.S. Lond., Honorary Surgeon to the Herefordshire General Hospital.
YOUNG, G., M.B., Ch.B.Glasg., Certifying Surgeon under the Factory and Workshop Acts for Cockermouth.
Medical Referees under the Workmen's Compensation Acts: KILVERT, J. E., M.R.C.S., L.R.C.P.Lond. (Circuit No. 19); ROTHERHAM, F. H., M.B.Lond., L.S.A. (Circuit No. 17); SOLLY, E., M.B.Lond., F.R.C.S.Eng. (Circuit No. 15); and WHITELOCKE, R. H. A., M.D.Edin. (Circuit No. 36).
David Lewis Northern Hospital, Liverpool: CHAMBERLAIN, E. N., M.B., Ch.B. Liverp. (Senior), COOKSON, C., CORLETT, R. L., HUGHES, H. T., PRIDIE, E. D., and SYKES, J. E., Resident Medical Officers.

Vacancies.

For further information refer to the advertisement columns.
Bath, Ministry of Pensions Hospital.—Jun. M.O. £350.
Birmingham and Midland Homœopathic Hospital and Dispensary.—Res. H. S. £175.
Birmingham General Hospital.—H.S., Obstet. H.S., and Res. Anæsth. Each £70.

Birmingham Orthopædic Centre.—Jun. M.O. £350.
Bolingbroke Hospital, Wandsworth Common, S.W.—Radiologist.
Bristol General Hospital.—H.P.'s and H.S.'s, &c. Each £125.
Burnley County Borough.—M.O. for Ven. Dis. £850.
Cardiff City.—Asst. M.O. £550.
Cardiff, Welsh National School of Medicine.—Lecturer in Forensic Medicine and Toxicology. £50.
Cheadle, Cheshire, Cheadle Royal.—Asst. M.O. £350.
Chester Royal Infirmary.—Hon. Asst. P.
Colchester, Essex County Hospital.—H.P. £200.
Derby, Nightingale Nursing Home.—Hon. Obstet. P.
Enfield, Middlesex, War Memorial Hospital.—Hon. Radiologist.
Evelina Hospital, Southwark, S.E.—S. to Out-patients (Hon.).
Exeter, Royal Devon and Exeter Hospital.—Sen. H.S. and Asst. H.S. £250 and £150 respectively.
Freemasons' Hospital and Nursing Home, 237, Fulham-road, S.W.—R.M.O. £250.
Hastings, East Sussex Hospital.—Hon. Asst. S.
Hospital for Sick Children, Great Ormond-street, W.C.—H.S., H.P., and Asst. Cas. O. Each £50.
Industrial Orthopædic Society, Manor House Hospital, Golders Green, N.W.—Med. Referee.
Leeds Public Dispensary.—Jun. Res. M.O. £150.
Liverpool Maternity Hospital and Ladies' Charity.—Hon. Asst. S.
London Temperance Hospital, Hampstead-road, N.W.—H.P. £120.
Maidstone, West Kent General Hospital.—H.S. £220.
Manchester, Ancoats Hospital.—R.M.O. £200. Med. Reg. £100. H.S. £100.
Manchester, Baguley Sanatorium.—Third A.M.O. £300.
Manchester Northern Hospital for Women and Children.—Anæsthetist. Half guinea per hour. Also Hon. Dental S.
Metropolitan Ear, Nose, and Throat Hospital, 2, Fitzroy-square, W.—Sen. Clin. Asst.
Newcastle-upon-Tyne Hospital for Sick Children.—Sen. and Jun. R.M.O.'s. £170 and £140 respectively.
Norwich, Norfolk and Norwich Hospital.—Cas. O. and H.S. £150.
Nottingham Board of Guardians.—District M.O. Also Public Vaccinator.
Oldham Union Poor-law Institution, Rochdale-road.—Res. Asst. M.O. £300.
Royal Free Hospital, Gray's Inn-road, W.C.—Second Ven. Dis. Asst. £100.
Royal Northern Hospital, Holloway-road, N.—M.O. to Out-patients. £150. H.P. and H.S. Each £100. Surgeon for Diseases of Ear, &c.
St. Andrew's Hospital, Dollis Hill, N.W.—Hon. Radiologist.
Seamen's Hospital Society, Greenwich, S.E.—H.S. and H.P. £150.
Sheffield, South Yorkshire Asylum.—M.O. £400.
Shrewsbury, Royal Salop Infirmary.—H.P. £160.
South Shields County Borough.—M.O. for Ven. Dis. £750.
Sunderland Royal Infirmary.—H.P. £160.
Wellcome Physiological Research Laboratories, Langley Court, Beckenham.—Bacteriologist.
Western Ophthalmic Hospital, Marylebone-road, N.W.—First and Second H.S.'s. £150 and £100 respectively.
West London Hospital, Hammersmith-road, W.—H.P. and Two H.S.'s. Each £100.
Westminster Hospital, Broad Sanctuary, S.W.—Surg. Reg. £50.
Weston-super-Mare Hospital.—H.S. £150.
Worthing Hospital.—Res. H.S. £150.

The Chief Inspector of Factories, Home Office, London, S.W., announces the following vacant appointments: Leith (Edinburgh), Malling (Kent), Shefford (Bedford), Tuxford (Nottingham), Lostwithiel (Cornwall), Long Eaton (Derby), Foyers (Inverness).

Births, Marriages, and Deaths.

BIRTHS.

CAMPBELL.—On Feb. 8th, at Idmiston-road, W. Norwood, the wife of Donald Campbell, L.D.S. Edin., of a daughter.
CASEMENT.—On Jan. 24th, at Mount Abu, Rajputana, India, the wife of E. R. Casement, of a daughter.
MATTHEWS.—On Feb. 13th, at Onslow-square, the wife of Dr. Guy Matthews, of a son.
MCCOMBIE.—On Feb. 14th, at Courtfield-gardens, S.W., the wife of Dr. McCombie, of a daughter.
WOOLRICH.—On Feb. 10th, at "The Croft," Beechwood-road, Sanderstead, the wife of Dr. W. G. Woolrich of a daughter.

MARRIAGES.

MARTLAND—FITTON.—On Feb. 13th, at St. Mark's, Heyside, Oldham, Capt. Edward N. P. Martland, R.A.M.C., to Mildred, elder daughter of the late Walter Fitton, and of Mrs. Fitton, Birshaw House, Shaw, Lancashire.
VICARY—PEARCE.—On Feb. 13th, at St. Marylebone Parish Church, Surgeon Lieutenant-Commander Walter P. Vicary, R.N., to Nora, third daughter of Sir William and Lady Pearce of Park-crescent, Portland-place, W.

DEATHS.

BARRITT.—On Feb. 14th, at the French Hospital, Shaftesbury-avenue, Captain Wesley Barritt, O.B.E., (Mil. Div.), Dental Surgeon, of Harley-street, W., aged 52.
LONG.—On Feb. 16th, at the residence of Dr. Beatrice Hinkle, New York, U.S.A., of pneumonia following influenza, Dr. Constance Long, of 48, Gordon-square, W.C. 1.
YEOMAN.—On Feb. 11th (suddenly, of pneumonia), at Hornby Lodge, Prestwich, Stanley Yeoman, M.B., B.C. Camb., M.R.C.S. Eng., aged 57 years.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Notes, Comments, and Abstracts.

AN OUTBREAK OF CHICKEN CHOLERA:
A BACTERIOLOGICAL AND HÆMATOLOGICAL STUDY.

BY A. KNYVETT GORDON, M.B. CAMB.,
MEDICAL SUPERINTENDENT OF THE VIROL PATHOLOGICAL RESEARCH LABORATORIES; PATHOLOGIST TO THE GREAT WESTERN RAILWAY FUND.

IN June, 1922, I was asked by Dr. H. A. Lake, of Beaminster, to investigate an outbreak of disease in a chicken farm in his district. The sequel presented some interesting features. The farm in question was devoted exclusively to the rearing of a fine strain of white leghorn fowls which had been bred on Mendelian lines. Previously healthy, the flock had just been visited by an outbreak of disease, the main feature of which was the suddenness of the onset and the fact that—so far as could be ascertained—the chickens mostly died within 24 hours with no symptoms except collapse; diarrhœa and catarrhal signs were both absent. Some dead chickens had been previously examined by a lay expert and stated to have suffered from coccidiosis, the diagnosis having apparently been made simply on the presence of white patches in the walls of the intestine. Later I was shown similar birds when I visited the farm; the white spots were obviously enlarged Peyer's patches.

In the first instance, however, I received a package containing six birds, all of which had been alive when despatched 24 hours previously from the farm. On arrival two were alive (A and B) and four dead (C, D, E, F). The living birds appeared healthy, but the dead ones were greatly emaciated. A and B were killed and all six birds submitted to a bacteriological and histological examination including a study of the heart's blood.

Macroscopical Examination.—All showed signs of septicæmia, slight in A and B and well-marked in the rest. The pleura and peritoneum were studded with petechial hæmorrhages and the liver and spleen were engorged and soft. The blood was fluid and "tarry," and the intestinal mucosa injected with a few capillary hæmorrhages in C, D, E, and F. No gross sign of coccidiosis was present, and films from the intestinal contents showed no coccidia in any stage. Cultures were taken with aseptic precautions and films prepared from the heart's blood and spleen of all the birds. Sections were made of the livers and spleens of A and F.

Microscopical Examination.—The livers showed dilatation of the interlobular veins, some biliary engorgement, and fatty degeneration of the hepatic cells, the changes being slight in A and well-marked in F. The spleens showed marked engorgement with cells which were found in films stained by the panoptic method to consist mainly of leucoblasts and cells of the lymphoidocyte type.

Bacteriology.—From the heart blood of A and B the bacillus of chicken cholera (Pasteurella) was grown in pure culture. The same organism was also present in cultures from the dead birds but contaminated with a long sporing bacillus, the nature of which was not fully investigated.

Hæmatology.—This was interesting. I may remark that in the normal fowl the red cells are nucleated and resemble something between the normoblast and megaloblast in the human subject. Polychromasia is absent. The normal leucocyte is of the leucoblast type—i.e., in man the ancestor of both granular (polymorphs) and non-granular cells (lymphocytes). This, incidentally, is what we should expect on the principle that the development of the individual is a recapitulation of that of the race.

In the dead birds the red cells were of three types: (*a*) the normal erythrocyte, (*b*) cells exactly resembling the human megaloblast, and (*c*) large polychromatic megaloblasts, some of which seemed to be intermediate stages between (*b*) and lymphoidocytes. In birds A and B a few megaloblasts were found on exhaustive search, but no polychromasia. The white cells showed total leucocytosis slight in A and B, well-marked in C, D, and E, and extreme in F. The cells were mainly of the normal "leucoblast" type, but in all typical lymphoidocytes (the ancestor of all blood cells, both red and white) were present. Of these, in A and B a few only were found on careful search, in F they numbered 25 per cent. The blood of all the dead birds also showed granular masses of protoplasm similar to those seen in advanced human leukæmia; they are probably dead leucoblasts in each case. All films were stained by the author's modification of Pappenheim's panoptic stain.

I then visited the farm with Dr. Lake. It was obvious that with the exception of one open field all the ground adjoining the huts in which the fowls were kept must have been by this time heavily charged with excreta of infected birds. It seemed impossible to devise any method of

adequate disinfection thereof, so even if all the birds were slaughtered a recrudescence of infection in the new stock seemed likely to occur. Consequently, a vaccine was prepared from the strain of Pasteurella isolated from birds A and B and the whole colony of 700 birds was inoculated therewith, an initial dose of 1000 millions being followed a week later by double the quantity. The result was successful. With the exception of four birds, which died shortly after the first inoculation and were probably infected, all recovered and no further cases of disease occurred. As much time and research had been spent on the perfection of the strain, which was a valuable one, the result was regarded as satisfactory.

While vaccination with attenuated live cultures is well known as one of Pasteur's classical experiments, I have been unable to discover in the literature of the subject any similar case of the use of an autogenous dead vaccine in chicken cholera. As the disease appears to be fairly prevalent I suggest that this procedure may be of practical use to chicken farmers. To the hæmatologist the presence of lymphoidocytes in the blood of the infected birds affords an interesting study in comparative pathology. In the fowl—as in some reptiles—the lymphoidocyte is only one stage further back than the normal leucocyte, so one would expect this cell to be present in the same way as in man when under certain conditions—e.g., severe bacillary infection—leucoblasts appear in the circulation. I may here remark that in a study of the blood in very young tadpoles I have found lymphoidocytes present together with intermediate forms both between the nucleated red cells and the white cell of the blood of the fully developed frog. Here, as in birds, this is of the leucoblast type.

I must gratefully acknowledge the courtesy of the owner of the farm, Mr. C. A. C. Streatfield, who throughout the investigation gave me every facility, including detailed clinical notes of the epidemic.

THE BRITISH SCIENCE GUILD.

WE have received from the Council of the British Science Guild an appeal for popular support contained in a booklet descriptive of the aims and work of the Guild. No technical qualifications are necessary for membership of this national organisation; although the latter has been in existence since 1905, its development has been hindered by lack of adequate funds. Its aims are briefly: (1) To stimulate among all classes active coöperation in national progress by the effective alliance of creative science, constructive invention, and productive industry; (2) to promote and extend throughout the United Kingdom and the Empire the use of accurate knowledge and scientific method in all industries, public affairs, and services; (3) to foster and diffuse the gifts of science among the young generation, and develop interest and enthusiasm in their power as applied to human welfare.

Methods of the Guild.

The methods by which the Guild works towards these ends are as follows: (*a*) The establishment of a headquarters organisation in London with ample funds and self-supporting branches in the provinces and Dominions; (*b*) provision of annual prizes, similar to the Nobel prizes, for scientific or medical discovery of practical value to humanity, or for new applications of science; of annual prizes open to all schools, and of travelling bursaries to suitable students, throughout the Empire; (*c*) to continue the appointment of special committees of experts to examine and report on developments felt to be urgent and ripe for realisation; (*d*) compilation of up-to-date consultative registers of progress in scientific and technical research and of scientific and technically equipped men and women, for use in information bureaus in London, the provinces, and the Dominions; (*e*) formation at headquarters of administrative committees to maintain touch with all legislative proposals of the Empire; to popularise scientific and technical aspects of State and public enterprises; (*f*) provincial and Dominion branches to coöperate in (*e*); to link up existing scientific and administrative organisations and to make it possible for local administrative and public problems to be examined and suitably tested first by experts; (*g*) to initiate conferences with non-scientific and class organisations, professional or occupational; to promote the development and application of inventions; (*h*) to arrange for lectures, exhibitions, and scientific demonstrations at home and abroad, to conduct a monthly magazine on popular lines for intercommunication and propaganda, and to arrange for the production and display of instructive cinema films, &c.

Work of the Committees.

The work of the committees—on which many distinguished representatives of science, education, and industry have coöperated—has included consideration of the following subjects: Awards for medical discovery, British chemical industries, conservation of natural sources of energy, industrial research and the supply of trained scientific workers, national education, coördination of charitable effort, design and manufacture of microscopes, medical research, and many other medical questions, prevention of the pollution of rivers, technical optics, and manufacture of optical instruments, and veterinary research. Many very valuable reports have been prepared by the committees and forwarded to Government departments concerned with the matters dealt with in them. Recommendations of committees of the Guild have also been widely acted upon outside Government departments.

Exhibitions and Cataloguing.

In 1918 and 1919 the Guild organised highly successful exhibitions of British scientific products, under the patronage of His Majesty the King. Local branches of the Guild have been established at Cardiff, Portsmouth, Glasgow, Newport, Brighton, and Birmingham, and several other centres are ready to be associated with the Guild's activities. The Guild's catalogue of British scientific and technical books, published in October, 1921, has been most favourably received. It contains the titles and bibliographic particulars of 6400 books, classified under approximately 50 main headings and 500 sub-headings, together with an index of authors and a subject index.

Forthcoming Meeting.

The promotion of efficiency and economy in industry, commerce, and all Imperial affairs by the progressive use of science and scientific method will be the subject of a public meeting to be held at the Mansion House on Feb. 27th, at which the Lord Mayor of London (a vice-president of the Guild) will preside.

THE TRAINED RADIOGRAPHER.

THE Society of Radiographers has recently issued a pamphlet[1] descriptive of its foundation and aims. The society was incorporated under the Companies Acts (1908–1917) on August 6th, 1920, with a view to giving a definite professional status to certificated non-medical assistants who work in X ray and electro-therapeutic departments. In order to put an end to the confusion with regard to the terms "radiographer" and "radiologist," it has now been generally agreed that the term "radiologist" shall be applied to members of the medical profession who undertake radiographic diagnosis and treatment by means of X rays and radium, while the term "radiographer" shall be applied to their trained non-medical assistants. The increasing complexity of X ray installations make it essential that assistants employed in their manipulation shall have undergone an adequate technical training and shall receive some official recognition of their responsibilities in view of the dangers attending the unskilful use of X rays. The society was formed to comprise those approved persons who are at present working at the subject, and to qualify new workers after due training and an exhaustive examination. Hospital authorities are reminded in this pamphlet that they may become liable to legal proceedings on the part of a patient who has suffered damage from unskilful application of X rays, and that an unskilled assistant may himself incur injury, and may claim damages as a result of such injury, while in the service of an institution. To avoid complications such as these a joint committee was formed consisting of representatives of the British Association for the advancement of Radiology and Physiotherapy, the Institution of Electrical Engineers, and of the practical radiographer-assistants themselves; and as a result the Society of Radiographers was formed, as far as possible on the same principles as those of the Pharmaceutical Society. An examination of a definitely high standard is held twice in the year, the subjects of examination being: Elementary Physics and Chemistry, the Principles of Apparatus Construction and Technique, Radiography, Radiation Therapy, and Radiographic Anatomy; successful candidates receive the Diploma of Member of the Society of Radiographers (M.S.R.). It is explicitly laid down in the constitution of the society that its members shall not undertake treatment in any shape or form except under the direction of a qualified medical practitioner. The society as now constituted numbers some 120 members; Sir Archibald Reid is president, and the society is governed by a Council comprising members of the three bodies which formed the joint committee. It is hoped that hospitals will coöperate with the society by employing only duly qualified persons as assistants in the responsible positions in X ray departments. A bureau has been formed in connexion with the society for the purpose of supplying information both to radiographers seeking employment and to institutions which require the temporary or permanent services of trained radiographers. Communications on either of these subjects should be addressed to the secretary, Society of Radiographers, 12, Stratford-place, W. 1.

[1] The Society of Radiographers: Its Aims and Objects.